Grid Director 4036/2036

Installation Manual

DOC-00467 A09

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Preface

About this Manual

This manual provides installation instructions for the Voltaire high-bandwidth, low-latency scalable 36-port InfiniBand 4036 QDR and 2036 DDR chassis. It includes the product specifications, unpacking and installation information, unit power up, and initiation and troubleshooting procedures.

Refer to the official and latest product release notes for last-minute updates.

Technical support may be obtained directly from:

- Your regional distributor from whom this product was ordered
- Your OEM customer representative

For further information and assistance, go to http://www.mellanox.com/content/pages.php?pg=support_index.

Audience

The manual is intended primarily for system administrators who are authorized to install a 4036 or a 2036 system.

It is assumed that the readers are familiar with the InfiniBand technology and terminology.

Related Documentation

For additional information, refer to the following documents:

- Grid Director Family Getting Started Guide [LIT-00037]
- Grid Director Family User Manual [DOC-00785]
- Grid Director Family Release Notes [DOC-00962]
- Regulatory and Compliance Reference Guide [DOC-00859]

Document Conventions

The following lists conventions used in this document.

NOTE: Identifies important information that contains helpful suggestions.

CAUTION: Alerts you to the risk of personal injury, system damage, or loss of data.

WARNING: Warns you that failure to take or avoid a specific action might result in personal injury or a malfunction of the hardware or software. Be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents before you work on any equipment.

Typography

The following table describes typographical conventions in Mellanox documentation. All terms refer to isolated terms within body text or regular table text unless otherwise mentioned in the Notes column.

Term, Construct, Text Block	Example	Notes
File name, pathname	*/opt/ufm/conf/gv.cfg*	
Console session (code)	`-> flashClear <CR>`	Complete sample line or block. Comprises both input and output. The code can also be shaded.
Linux shell prompt	`#`	The "#"character stands for the Linux shell prompt.
Mellanox CLI Guest Mode	`Switch >`	Mellanox CLI Guest Mode.
Mellanox CLI admin mode	`Switch #`	Mellanox CLI admin mode
String	`< > or []`	Strings in < > or [ ] are descriptions of what will actually be shown on the screen, for example, the contents of <your ip> could be 192.168.1.1
Management GUI label, item name	**New Network,** **New Environment**	Management GUI labels and item names appear in bold, whether or not the name is explicitly displayed (for example, buttons and icons).
User text entered into Manager, e.g., to assign as the name of a logical object	**"Env1", "Network1"**	Note the quotes. The text entered does not include the quotes.

1 Introduction

1.1 4036/2036 Switch Overview

The Mellanox Grid Director 4036/2036 is a high performance, low latency and fully non-blocking InfiniBand switch for high performance clusters. Delivering 2.88 Tbps of non-blocking bandwidth with less than 100 nanoseconds of latency (port-to-port), I/O bottlenecks are removed making applications operate at maximum efficiency.

The 4036/2036 was designed to fit into today's densely configured racks. It has thirty-six 40Gbps ports that use the new smaller and intelligent QSFP connector in a 1U chassis that is only 15" deep. The efficient 4036/2036's smart design makes it is easy to build clusters that can scale-out into the thousands of nodes.

To meet varying application needs, the 4036 offers Quad Data Rate 4X ports (QDR provides a date rate of 40, 20 or 10 Gb/s auto-negotiable) while the 2036 offers Dual Data Rate 4X ports (DDR provides a data rate of 20 or 10 Gb/sec auto-negotiable).

The 4036/2036 switch incorporates redundant, hot-swappable power supplies for High Availability, as well as a hot-swappable fan unit. The 4036/2036 offers a plug-and-play environment, allowing servers to be added without taking down the fabric.

The 4036/2036 includes a high-performance CPU for management purposes.

Grid Directors 2036 and 4036 are identical in appearance, distinguishable only by the product ID label on the chassis.

The following figure shows the front view of a 4036 Unit. The front view of the 2036 is identical.

Figure 1: 4036/2036 Front View

The following figure shows the rear view of a 4036 Unit. The rear view of the 2036 is identical.

Figure 2: 4036/2036 Rear View

NOTE: The 2036 and 4036 switches are identical in appearance. Therefore, the graphic representations are generic and are applicable to either switch.

1.2 4036/2036 Switch Main Features

- Thirty-Six auto-negotiating QSFP InfiniBand ports in a 1U chassis:
  - The 4036 switch is equipped with QDR ports (40 Gbps per port)
  - The 2036 switch is equipped with DDR ports (20 Gbps per port)
- 1Ux19"x15" non blocking standalone switch using a single switch chip
- QSFP ports supporting any type of cable, Copper or Optical.
- High performance, low power CPU for device management
- Ultra low latency under 100 ns (nanoseconds)
- Available aggregate bandwidth of up to 2.88 Tbps (QDR), 1440 Gbps (DDR), or 720 Gbps (SDR)
- Architected to provide high MTBF
- Redundant, hot-swappable power supplies
- Front-to-back or back-to-front hot-swappable fan unit.
- QSFP InfiniBand ports supporting copper or optical cables and adapters
- Built-in cable detection and optimization to achieve the longest available cable distance and highest performance
- Built-in high availability

1.3 Management

The Grid Director 4036/2036 includes smart device management that provides a simple interface for deploying, troubleshooting, maintaining and upgrading the switch. With a simple to use CLI interface, routine tasks such as monitoring the switch's operation or upgrading software and firmware are made simple.

The Grid Director 4036 comes with an onboard subnet manager, enabling simple, out-ofthe-box fabric bring-up for small to medium clusters.

Refer to the *4036/2036 User Manual* for details on 4036/2036 software requirements and configuration.

2 Unpacking

2.1 Package Contents

The 4036/2036 switch is supplied in a cardboard box. The switch is delivered with either one or two pre-installed hot-swappable power supplies (according to configuration) and one hot-swappable fan unit.

Additional components include:

- Two power cords (one per power supply)
- Rail kit (for details, see Rail Kit (KIT-00008) (on page 13))
- A multipurpose console cable kit (Mng)
- Getting Started Guide
- A product CD containing 4036/2036 switch documentation and software

Before unpacking, make sure that the box is sealed and undamaged.

Before beginning the installation of the 4036/2036 switch, verify that the package contains the items detailed in the packing list.

Check for loose parts or any visible damage to the contents. Notify your supplier if you detected damaged or missing parts.

2.2 Unpacking the 4036/2036 Switch

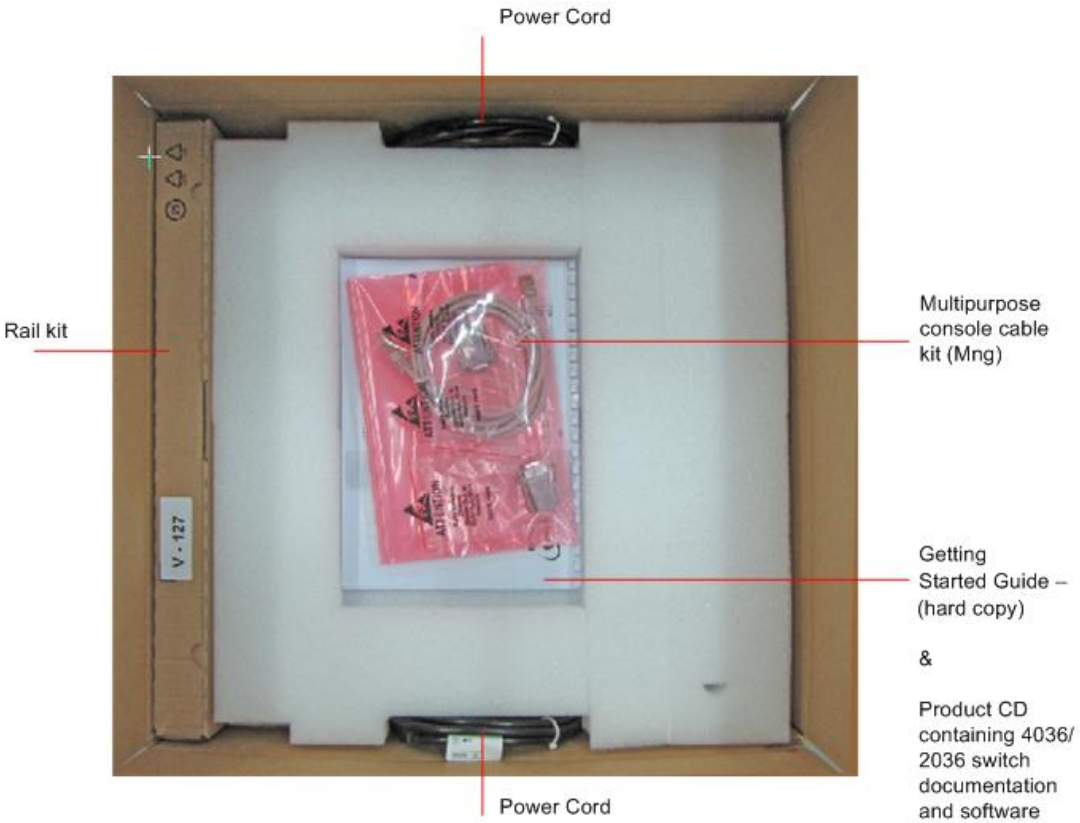
This section details the 4036/2036 package contents and provides instructions on how to unpack the chassis.

The iDataPlex Rail Kit and packaging are detailed in Option 3 – Chassis Installation in an iDataPlex Rack (on page 59).

➢ ***To unpack the 4036/2036 chassis***

1. Open the box and check that it contains the items as shown.

Figure 3: 4036/2036 Cardboard Package (Open) - Standard



NOTE: Keep the original packing materials; they will be needed if:

- The product needs to be moved. For example if it is staged at one location before being delivered at the production site.
- A module needs to be returned for repair, replacement, or upgrade.

2. Remove the box containing the Rail Kit, the Power Cords, and the multipurpose console cable kit (Mng).
3. Remove the Getting Started Guide which also contains the Product CD.
4. Remove the top foam.

5. Carefully remove the 4036/2036 switch. Use the dedicated niche to lift the switch, as shown in the following figure.

Figure 4: Removing the 4036/2036 Switch from the Cardboard Package

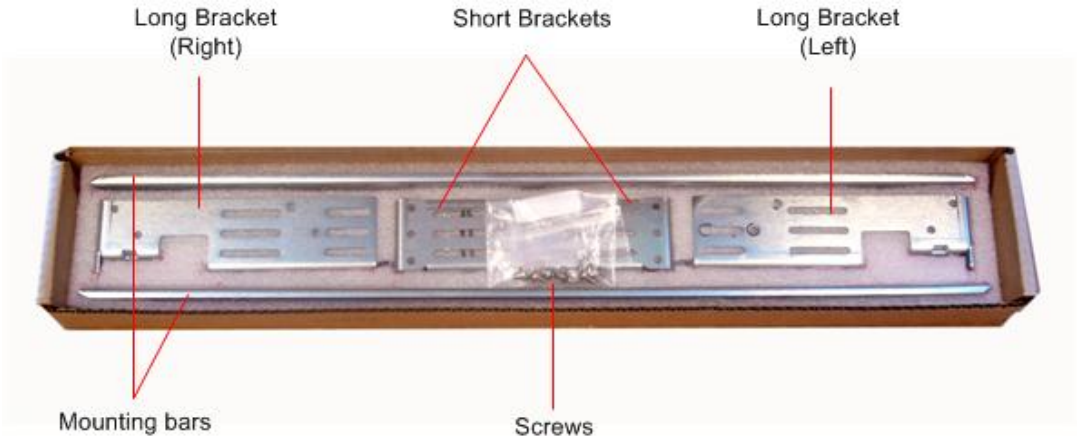
6. Remove the protective antistatic bag from the 4036/2036 switch.

2.3 Rail Kit (KIT-00008)

The rail kit entails:

- 2 Short Brackets (Angular bracket mount)
- 2 Long Brackets (Left and Right)
- 2 mounting bars
- 14 pan head Philips screws, 8-32 x 1/4" with tooth lock washers and nylon patch

Figure 5: Fixed Rail (KIT-00008)



2.4 Multipurpose (Mng) Console Cable Kit

The multipurpose console kit (Mng) contains:

- RJ45 to RJ45 cable
- A RJ45 to DB-9 cross-adaptor for RS-232 console connection (CLI). (The DB-9 adaptor has a number 26 printed on it. This means that pins 2 and 6 are crossed).
- A RJ45 to DB-9 adaptor for RS-232 console connection

2.5 Packing the 4036/2036 Switch

You may need to move the 4036/2036 switch to a different location or send it for repair; should this be necessary, pack the equipment as described below.

➢ ***To pack the 4036/2036 chassis***

1. Unmount the 4036/2036 switch from the rack.
2. Dissassemble the rail brackets and pack the parts in the rail kit box.
3. Insert the 4036/2036 switch into its antistatic bag.
4. Carefully lift the switch, making sure that the bottom of the switch is facing down. **Tip:** you can easily identify the bottom of the switch since it has a certification label.
5. Check the niches in the bottom foam to make sure that you are inserting the switch in the correct direction as shown in the following figure. Note that the ID Tag is fragile and could bend, use extra caution.

Figure 6: Packing the 4036/2036 Switch

6. Insert the switch into the cardboard box and place it on the bottom foam.
7. Place the top foam on top of the switch.
8. Slide the rail kit box in the dedicated niche alongside of the switch, as shown in the illustration in Unpacking the Switch (on page 59).

   IMPORTANT NOTE: When sending the switch for repair without the rail kit, it is still important to secure the switch by filling this niche with a filler. This will protect the switch and prevent it from moving during transportation.
9. Place the Getting Started Guide and the Multipurpose Console Kit (Mng) **on top** of the top foam as shown in the illustration in Unpacking the Switch (on page 59).
10. Place the power cords in the allocated spaces in the foam, as shown in the illustration in Unpacking the Switch (on page 59).
11. Use tape to close the box and verify that the box is securely closed.

3 Getting Started

3.1 Front Panel Description

This section details the front panel 4036/2036 chassis.

Figure 7: 4036/2036 Front Panel

1. Swappable power supply modules
2. LEDs:
   - System power
   - Info LED
   - SM
   - Fan unit
   - Power supply
3. AC power inlet
4. Reset Button
5. Swappable fan unit

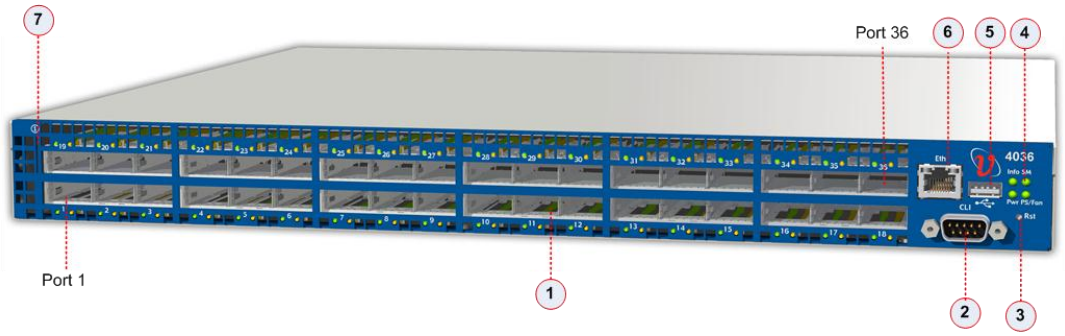
Table 1: 4036/2036 Front Panel Components

Component	4036 /2036 No. of components	Function
Power Supply (PSU)	1 or 2 (according to configuration)	Provides the 4036/2036 DC supply. One or two AC/DC 100-240Vac to 12Vdc 350W hot-swappable redundant power supplies are installed in the 4036/2036 switch. The power supply has an IEC Power Receptacle that supplies the 4036/2036 input voltage, as indicated in the power supply characteristics in Power Specifications - Power Supply Module (on page 25).
Fan Unit	1	Hot swappable fan unit hosting three internal fans for high availability. Auto-heat sensing to allow for silent fan operation Two options are available: Front-to-rear cooling (labeled as "Air-in") Rear-to-front cooling (labeled as "Air-out")

Component	4036 /2036 No. of components	Function
Reset Button	1	When pressed for more than 1 second, resets the entire unit.
LEDs (Status Indicators)	5	• System Power – Chassis power OK LED - ON/OFF • Info LED – User-defined LED for management use. Sets the Info LED on a desired module. When you enable this LED through the GUI or CLI, you can go on site and immediately physically locate the module. • SM – Subnet Management (active or standby) • Fan Unit – Fan indication. Turns off as a result of fan failure • Power Supply – Power indication. Turns off as a result the failure of the power supply unit

3.2 Rear Panel Description

This section details the rear panel of a 4036/2036 chassis.



1. 36 InfiniBand QDR (Quad Data Rate) ports using standard QSFP InfiniBand Connectors and LEDs supporting copper, active copper or optical cables.
2. CLI (RS-232) DB9 Connector
3. Reset Button
4. LEDs
   - PWR LED
   - Info LED
   - PS/FAN LED
   - SM LED
5. USB Connector
6. Gigabit Ethernet auto-negotiating RJ45 Connector for management 1Gbps/100Mbps/10Mbps (& LED)
7. ID Tab

NOTE: Port #1 is located at the bottom left hand side of the rear panel, Port #36 at the top right hand side.

Table 2: Rear Panel Components

Component	No.	Function
InfiniBand Port Connector	36	4X QSFP InfiniBand connectors for passive copper cables, active copper cables, active optical cables, and connect optical cables.
InfiniBand Port Indicators (LEDs)	64	Indicates the physical and logical status of each InfiniBand port. (2 LEDs per port)
RS232 serial interface	1	D-sub -9 pin connector (serial interface) for CLI
10/100/1000 Ethernet port RJ-45 Connector	1	Gigabit Ethernet auto-negotiating RJ-45 Connector for management 1Gbps/100Mbps/10Mbps (& LED). Provides out-of-band management interface over a local network.
LEDs (Status Indicators)	4	• 1 Pwr – System power status • 1 PS/FAN LED • 1 Info LED – Indicates the unit physical location (user-defined) • 1 SM LED
Chassis reset button	1	When pressed for more than 1 second, resets the entire unit.
USB connector (Type A)	1	One USB 2.0 Host interface allows you to increase the CPU flash memory by a connection to a standard Disk-On-Key device.
ID Tab	1	Includes the Switch Part and Serial Numbers

4 Product Options

4.1 4036/2036 Switch Available Configurations

The Grid Director 4036/2036 is a 1U entry level 36 InfiniBand 4X ports switch, providing bidirectional 40 Gbps/20 Gbps per port grid connectivity, potentially serving as an edge switch in large fabrics (where the 4036/2036 is serving as core switch) or as a standalone managed unit in smaller clusters.

4.2 InfiniBand Clusters Using the 4036/2036 Switch

The Grid Director 4036/2036 switch is designed as a standalone unit or as a building block for larger clusters.

The following figures show a simple 36-server single-hop non-blocking configuration using a single 4036/2036 switch.

Figure 8: InfiniBand Cluster Using 4036 Switch Single-hop Configuration

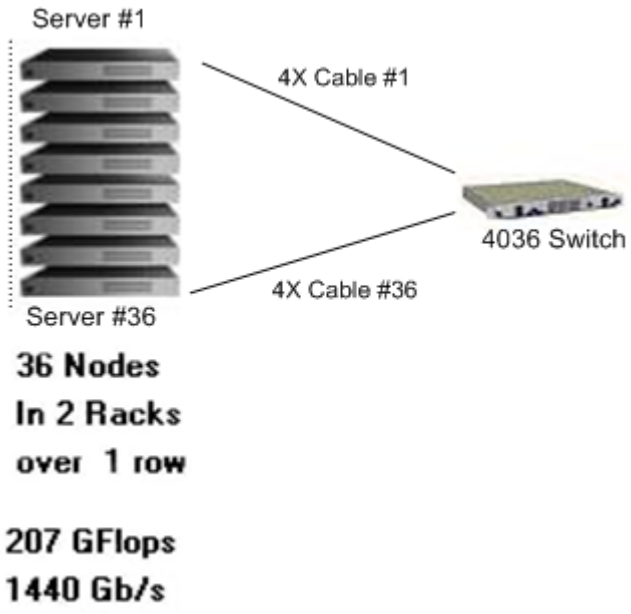
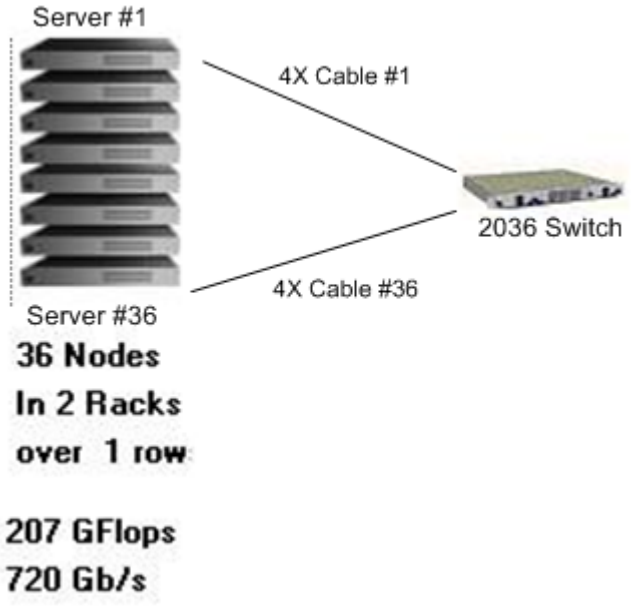
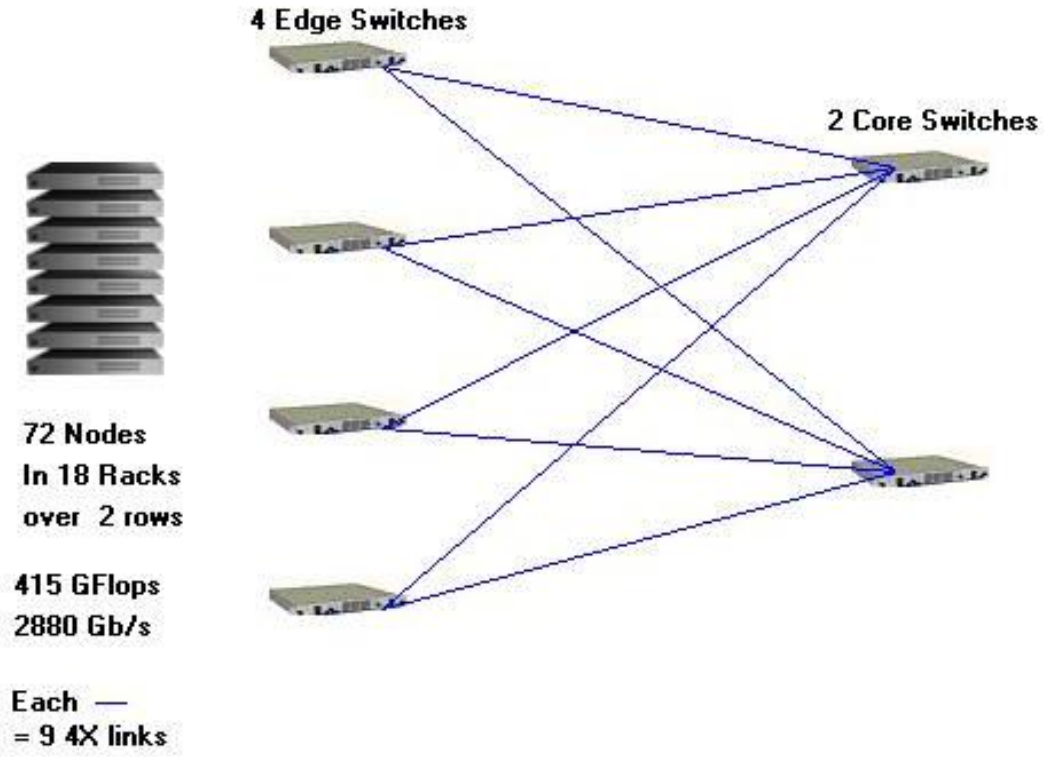


Figure 9: InfiniBand Cluster Using 2036 Switch Single-hop Configuration

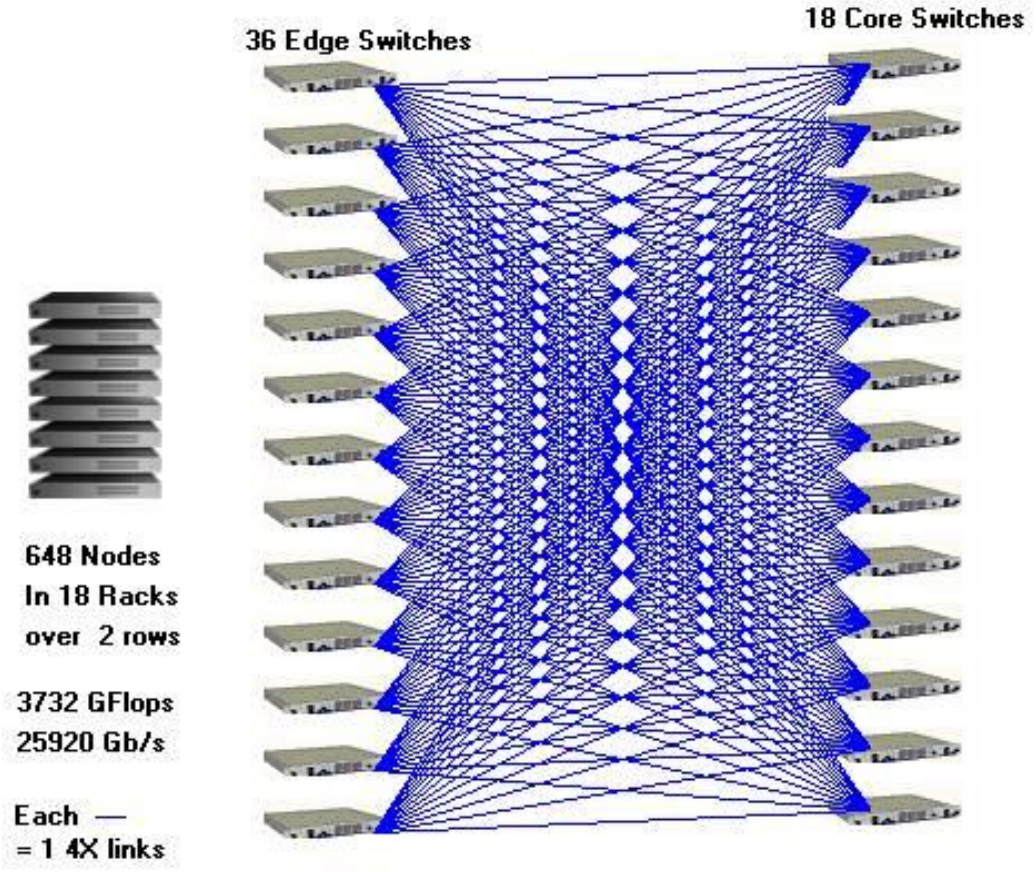


The following figures show a triple-hop non-blocking configuration, based on multiple 4036/2036 switches functioning as the cluster building blocks.


4 Edge Switches
2 Core Switches
72 Nodes
In 18 Racks
over 2 rows
415 GFlops
2880 Gb/s
Each —
= 9 4X links

The following figures show another example of a three-hop non-blocking configuration, based on multiple 4036/2036 functioning as the cluster building block.

Figure 10: InfiniBand Cluster Using 4036/2036 Switch Three-hop Configuration



4.3 Ordering Information

Table 3: 4036/2036 Switch Ordering Information

Number	Name	Description
VLT-30113	Grid Director 2036 2PS	2036 1U 36 port DDR Switch, front-to-back cooling, dual PS
VLT-30013	Grid Director 2036 2PS	2036 1U 36 port DDR Switch, back-to-front cooling, dual PS
VLT-30114	Grid Director 2036 1PS	2036 1U 36 port QDR Switch, front-to-back cooling, single PS
VLT-30111	Grid Director 4036 2PS	4036 1U 36 port QDR Switch, front-to-back cooling, dual PS
VLT-30011	Grid Director 4036 2PS	4036 1U 36 port QDR Switch, back-to-front cooling, dual PS
VLT-30112	Grid Director 4036 1PS	4036 1U 36 port QDR Switch, front-to-back cooling, single PS

Number	Name	Description
VLT-30015	Grid Director 4036 1PS	4036 1U 36 port QDR Switch, back-to-front cooling, single PS

Table 4: 4036/2036 Module Ordering Information

Number	Name	Description
VLT-30029-F	PS-36 AC FRU	PS-36 AC, FRU
VLT-30030-F	FAN-1U Unit Back-To-Front FRU	FAN-1U unit back-to-front cooling, FRU
VLT-30031-F	FAN-1U Unit Front-to-Back FRU	FAN-1U unit front-to-back cooling, FRU
KIT-00008	Rail Kit	
KIT-00004	iDataPlex Mounting Kit	(Not part of the standard packing list)
510K00022-F	CG-24	Cabling guide bracket kit (Not part of the standard packing list)

Table 5: 4036/2036 Switch Packing List (According to Configuration)

Chassis	P/N	Power supply unit	Power cord, PDU plug	Fan unit Air in	Fan unit Air out	Rail kit	iDataPlex rail kit	Cabling guide bracket kit	Multipurpose Mngmnt console cable kit	Product CD (documentation & software)	Getting Started Guide hard copy
		PSU-1U	PowerCord	Fan Unit 1U	Fan Unit 1U	KIT-0008	KIT-0004	CG-24	Mng		
4036 (2 PS)	VLT-30011	2	2	-	1	-	1	*	1	1	1
	VLT-30111	2	2	1	-	1	-	*	1	1	1
4036 (1 PS)	VLT-30112	1	2	1	-	1	-	*	1	1	1
	VLT-30015	1	2	-	1	-	1	*	1	1	1
2036 (2 PS)	VLT-30013	2	2	-	1	-	1	*	1	1	1
	VLT-30113	2	2	1	-	1	-	*	1	1	1
2036 (1 PS)	VLT-30114	1	1	1	-	1	-	*	1	1	1

(*) Optional

5 Technical Specifications and Certifications

5.1 4036/2036 Switch Technical Specifications

Table 6: 4036/2036 Switch Technical Data

Features	Details
Grid Director 4036/2036 - General	• 19-inch front or rear rack mountable chassis, height: 1U, depth: 15" • 4036 with Quad Data Rate (QDR) 40 Gbps ports • 2036 with Double Data Rate (DDR) 20 Gbps ports
InfiniBand Ports	• 36 QSFP interfaces • 36 4X Quad Data Rate ports (QDR – 40 or 20 or 10 Gbps auto-negotiate) • 36 4X Dual Data Rate ports (DDR - 20 or 10 Gbps auto-negotiate) • 36 4X Single Data Rate (SDR - 10 Gbps) • Interconnect options: QSFP passive and/or active copper /fibre optic cables • All ports are located on the rear panel • Indicators: physical and logical status, SM, PSU DC OK, Fan OK, Info, and Power
Switch Specifications	• Aggregate Data Throughput: 2.88 Tbps (QDR), 1440 Gbps (DDR) or 720 Gbps (SDR) • Port-to-port Latency: under 100 nanoseconds (max.) • Linear Forwarding Table: 48K entries • Multicast Table Size: 1K entries • Data Virtual Lanes: 8 • Management Virtual Lanes: 1 • MTU: 4096 Bytes (max)
Management	• The 4036/2036 has an active CPU enabling for low-level chassis management purposes and cable optimization. • Connectors: EIA/TIA-232 console (DB-9 connector) • RJ45 jack connector for 10/100/1000 Ethernet port on the rear panel Chassis Reset Button on the front and rear panels • USB port on the rear panel
Cooling	• Hot swappable fan unit containing three fans for high availability • Auto-heat sensing to allow for silent fan operation • Front-to-rear or rear-to-front cooling (different fan unit Part Numbers) • Airflow: 52 CFM in turbo mode; 43 CFM in normal mode
Physical Characteristics	• 19-inch front or rear rack-mountable chassis • Dimensions (H x W x D): 1.69 in. (43 mm) x 16.93 in. (430 mm) x 15 in. (381 mm) • Rail kit for rack mounting • Optional cabling guide bracket kit designed for cable management • Weight: 17 lb (7.7 Kg), excluding rack mounting

Features	Details
Environmental	Operating Temperature: • 32°F to 113°F (0°C to 45°C) • Humidity: 15% to 80%, non-condensing • Altitude: 0 to 9843 ft (3000m) Storage Temperature: • -13°F to 185°F (-25°C to +85°C) • Humidity: 5% to 90% non-condensing • Altitude: 0 ft to 15,000 ft (4570 m) Maximum Ambient Temperature: 45°C

5.2 Power Specifications - Power Supply Module

Table 7: Power Supply Module Data

Attribute	Specification
Power Supplies	• Dual redundant power supply slots • 1 or 2 hot-swappable power supplies, according to configuration • Power supply with built-in power inlet
Electrical ratings [V, A, hz]	100-240Vac, 5.0A, 50/60 Hz 2.6A@120V 1.54A@230V 47-63Hz, auto-sensing
Power Inlet Type	C14
Power Rating	Power consumption*: 4036 - Maximum: 202W Typical: 152W (Numbers relate to copper cables. For optic cables add 1.5W per port.) 2036 - Maximum: 187W Typical: 141W (Numbers relate to copper cables. For optic cables add 1.5W per port.) BTU/hour = Watts x 3.413 Each optical adapter in use adds 1.5W max to the above consumption.
Power Factor:	120 Vac/60 Hz/Max Load = 0.99 230 Vac/60 Hz/Max Load = 0.96
Maximum Power Draw	256W
Power Supply Efficiency	83%(115V) / 87%(230V)
Leakage current @ 254V	2.422 [mA]
2 power cords	2-meter long, with a universal plug for PDU (Power Distribution Unit)

5.3 Certifications

Safety

- cTUVus (USA/CAN); CE according to EN 60950-1 First Ed.
- MET Labs (NRTL)
- CE according to EN 69950-1
- CSA C22.2 60950-1
- S-Mark Argentina
- CB Certificate and report, according to IEC 60950-1 First Ed.
- MIC Korea
- Gost-R

EMC Certifications

- FCC Part 15, Subpart B, Class A and testing to ANSI 63.4
- Industry Canada ICES-003 (CAN/CSA-CEI/IEC CISPR 22:02)
- CE EN55022: 1998 + A1:2000 + A2:2003
  - EN55024: 1998 + A1:2001 + A2:2003
  - EN 61000-3-2:00+A2(05) Harmonic current emissions
  - EN 61000-4-2: 1995 + A1: 98 + A2: 2001
  - EN 61000-4-3: 02 + A1: 2002
  - EN 61000-4-4: 1995 + A1: 01 +A2:2001
  - EN 61000-4-5: 1995 + A1: 2001
  - EN 61000-4-6: 1996 + A1: 2001
  - EN 61000-4-8: 1993 + A1:2000
  - EN 61000-4-11: 1994 + A1: 2001
  - EN 61000-3-3:94+A1 (01) Voltage fluctuations and flicker
- Japan VCCI Technical Requirements, V.3/2001.04/CISPR 22:1997 + A1: 2000 + A2: 2002, Class A.
- Australian/New Zealand C-Tick, AS/NZS CISPR 22:04
- MIC Korea

Restricted Hazardous Substances Certification

RoHS-5

InfiniBand Certification

IBTA 1.2

5.4 Gost-R Certification

The Mellanox products comply with the Gost-R Russian safety regulations.

5.5 Declarations

5.5.1 Declaration of Conformity

Mellanox products comply with the Radio & Telecommunications Terminal Equipment Directive 99/5/EEC, the EMC Directive 89/336/EEC, and of the Low Voltage Directive 73/23/EEC.

5.5.2 Hazardous Substances (RoHS 5) Compliance Declaration

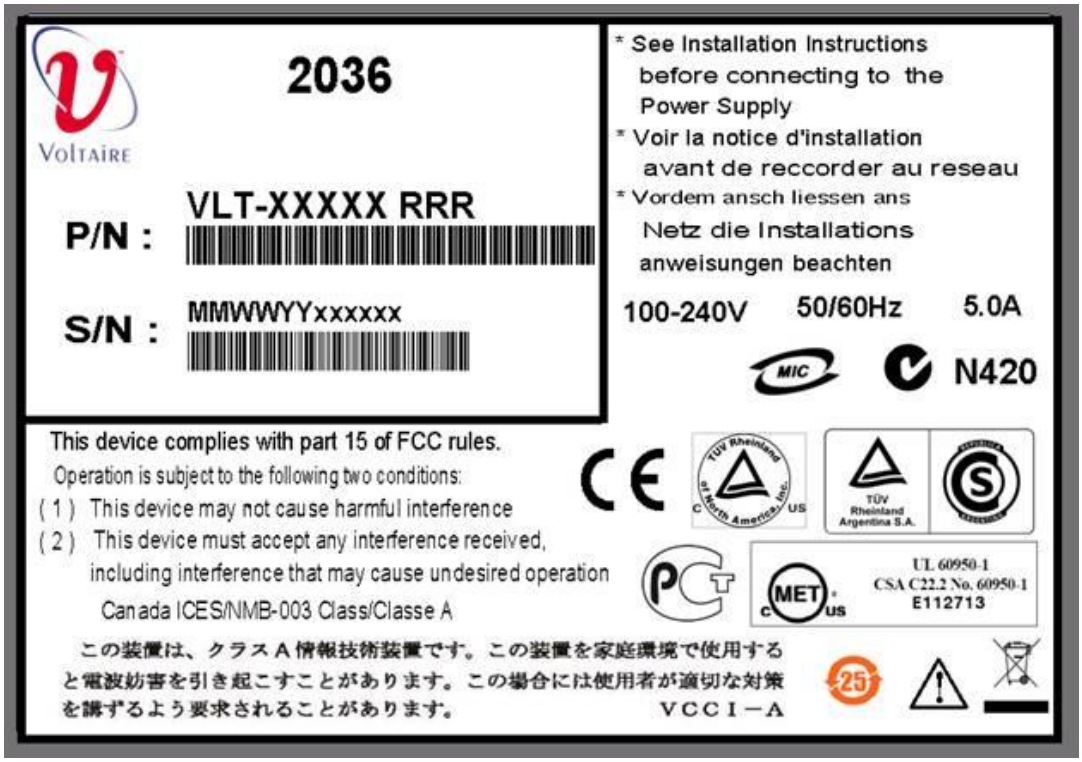
Mellanox products comply with the RoHS directive under the exemption (RoHS 5) of lead in solders for servers, storage and telecommunication infrastructure.

5.6 Label(s)

The 4036/2036 label (example) below shows all safety and EMC text and logos.

Figure 11: 4036 Label (Example)

Figure 12: 2036 Label (Example)



5.7 Shock and Vibration

Prepare the 4036/2036 switch to ship in a rack by carefully following the rail kit installation and instructions, as detailed in Chapter 6 (on page 31). The 4036/2036 is susceptible to shock and vibration damage if the rail kit installation instructions are not followed precisely.

5.8 Chassis Clearance Requirements

Table 8: Clearance Requirements

Area	Recommended Minimum Clearance
Front of the rack	4" (10 cm)
Rear side of the rack	4" (10 cm)
Space below the chassis	No limits
Space on top of the chassis	No limits

5.9 Weights and Dimensions

Table 9: Unpacked Weights & Dimensions

	English (lbs/in)				Metric (kg/cm)			
Module	**Weight**	**D**	**W**	**H**	**Weight**	**D**	**W**	**H**
4036/2036	17	15.7	17	1.7	7.7	40*	43*	4.3*
Power Supply	2.8	10.2	4.9	1.6	1.3	26	12.4	4
Fan	1.1	4.1	7.1	1.7	0.5	10.5	18	4.3

1 in = 2.54 cm 1 kg = 2.205 lbs

* Including handles

Table 10: Packed Weights & Dimensions

	English (lbs/in)				Metric (kg/cm)			
Module	**Weight**	**D**	**W**	**H**	**Weight**	**D**	**W**	**H**
4036/2036	31.31	24.41	22.44	6.69	14.2	62	57	17

5.10 Acoustic Data

The 2036/4036 acoustic noise Sound Pressure Level is: **64.3 dB** (A)

5.11 Export Information

CTP (Composite Theoretical Performance) is a calculation measured in MTOPS (millions of theoretical operations per second).

The 460EX/460GT contain a 440H6 core (not a 460 core; it is called 460 to distinguish it as a 90 nm core).

The CTP (in MTOPS) for the PPC440 core = (17/18) * F

(where F is the CPU clock rate in MHz).

The following table provides CTP values.

CTP value for the PPC440 core 460EX/460GT @ 600MHz	~ 567 MTOPS
CTP value for the PPC440 core 460EX/460GT @ 1000MHz	~ 944 MTOPS
ECCN	5A991C

5.12 Shipping Restrictions

None.

6 Hardware Installation

This chapter describes how to prepare your site for installation and how to prepare and install the 4036/2036 switch.

The 4036/2036 switch is a 19” rack mounted, 1U high chassis provided with a rail kit accommodating racks of different depths with a front-to-back distance between mounting rails of 26" to 36" (660 mm to 914 mm).

It is recommended to use the optional 4036/2036 Cabling Guide Brackets to arrange the numerous cables that are connected to a chassis.

6.1 Installation Options

Option 1 – The front of the switch faces the front of the rack and is installed with a 5-in. indentation. This allows AC inlets accessibility from the front of the rack while the power cables are routed sideways to the power source. This option is detailed in Option 1 (on page 35).

Option 2 – The rear of the switch (InfiniBand connector side) faces the front of the rack and is installed in-line with the rack’s front rails. This option is detailed in Option 2 (on page 42).

Option 3 – For the iDataplex rack - The rear of the switch (InfiniBand connector side) faces the front of the iDataplex rack and is installed in-line with the rack’s front rails. This option is detailed in Appendix A (on page 59).)

CAUTION: Before installing the 4036/2036 switch in a rack, read the Site Planning (on page 32) section and Safety Information to get familiar with proper site and environmental conditions.

6.1.1 Cooling

For both option 1 and option 2, the switch can support both front to rear and rear to front cooling options, based on the specific part number that was ordered (different fan unit).

6.2 Required Tools

The following materials and tools are required for mounting the 4036/2036 chassis into a rack.

Table 11: Materials and Tools Required

Quantity	Description
1	Flat-blade screwdriver
1	Phillips screwdriver
1	Measuring tape
8	Floating clip nuts (not provided by Mellanox)
8	Phillips screws (not provided by Mellanox)

6.3 Site Planning

Planning the proper location and layout of your equipment rack or wiring closet is essential for successful 4036/2036 switch operation. Equipment placed too close together or in an inadequately ventilated area can cause overheating of the system. In addition, poor equipment placement can render system panels inaccessible and difficult to maintain.

To ensure normal operation and avoid unnecessary maintenance, plan your site configuration and prepare your site *before* installation.

6.3.1 Rack and Clearance Requirements

The 4036/2036 switch occupies 1U in a 19"rack and can be mounted either way, with the InfiniBand ports facing the rear or the front of the rack. Switch cooling direction is either from back-to-front or front-to-back, according to the switch fan unit configuration.

The rack brackets mounting holes conform to the IEA-310 standard for 19-inch racks.

The 4036/2036 switch places no restrictions on rack location. It is recommended to mount the 4036/2036 chassis near the middle of the rack, at or near eye level, to make it easy to see status indicators, port numbers, etc.

It is also recommended to mount the rear side of the 4036/2036 switch in a way that enables easy access to the InfiniBand cables, connectors, and LED indicators. It is recommended to leave 4" (10 cm) for chassis clearance both in the front and the rear of the chassis. These requirements are also listed in Chassis Clearance Requirements (on page 29).

6.3.2 Site Environment Specification

For the operating and non-operating environmental site requirements for the 4036/2036, see Power Specifications - Power Supply Module (on page 25).

The system can continue to operate within specified environmental ranges; however, a measurement that approaches the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental conditions before they exceed the maximum operating range.

6.3.3 Power Requirements

Power requirements are useful for planning the power distribution system needed to support the 4036/2036 switch. Heat dissipation is an important consideration for sizing the air-conditioning requirements for an installation. Verify the available power source at the site for the type of device you are installing.

For the 4036/2036 switch power requirements, see Power Specifications - Power Supply Module (on page 25).

The 4036/2036 switch requires one or two power connections using standard 3-wire AC power cords including a safety ground. The input voltage characteristics can be found in the power supply specifications, in Power Specifications - Power Supply Module (on page 25).

The 4036/2036 switch includes two hot-swappable redundant power supplies, providing full back-up purposes.

6.3.4 Site Preparation Checklist

To help prepare your site for installing the Grid Director 4036/2036 chassis, use the following checklist.

Table 12: Site Preparation Checklist

Task	Prepared by	Date	Notes
Environmental requirements			
Locate power sources			
Measure space for the rack, including specified maintenance clearances			
Acquire specified cables and connectors			

6.4 Measuring the Distance between Mounting Rails

➢ ***To measure the distance between the rack mounting rails:***

1. Place the 4036/2036 chassis on a flat surface.
2. Using a measuring tape, measure the front-to-back distance between the rack vertical mounting rails. This step is very important so that you know exactly how to calculate the exact rail length.
3. Mark the rack's U levels at which you would like to mount the switch. This is important so that you can install the clip nuts in the adequate holes and ensure that the chassis is leveled.
4. Using a flat screwdriver, install the clip nuts in the rack at the U level noted in Step 3.

6.5 Assembling and Mounting the Rail

6.5.1 Rail Kit

The fixed rail is supplied as part of the rail kit and accommodates different rack depths.

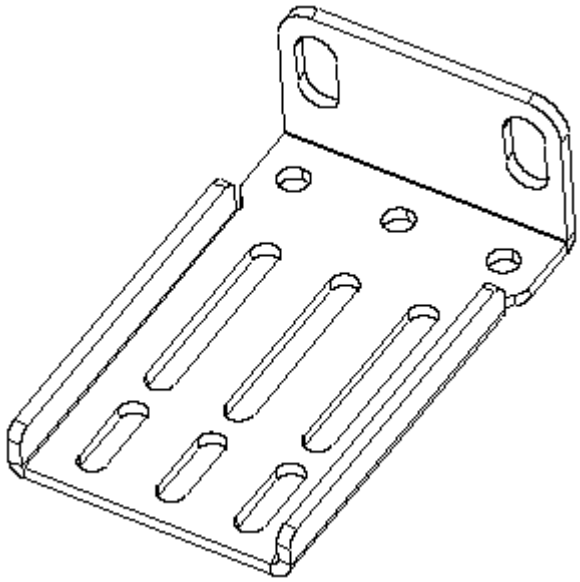
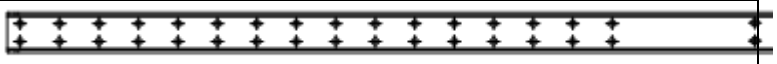
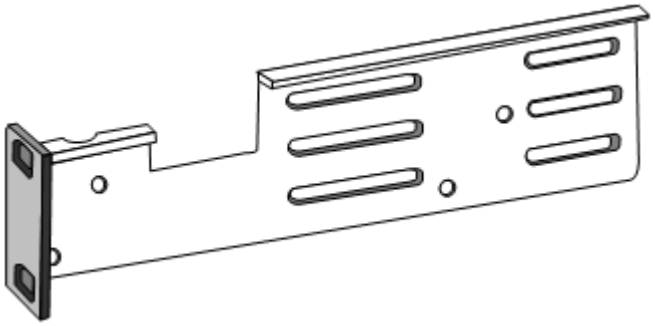
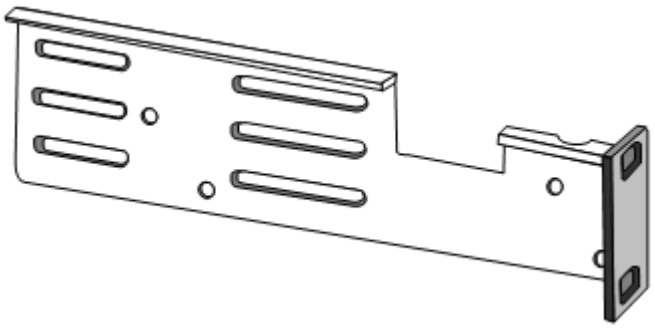
The rail mounting has holes spaced 2 inches apart and can be mounted in several positions along the side of the chassis to accommodate the depth of the rack.

- Installation Option 1 (on page 35) and Option 2 (on page 42) require a rail kit.
- Installation option 3 (see Appendix A (on page 59)) requires a mounting kit for the iDataplex rack.

The following table shows the list of items required for the installation of the fixed rail. Note that this only applies to Option 1 and 2. Option 3 (see Appendix A) entails different parts.

Note: Item sizes are not proportional

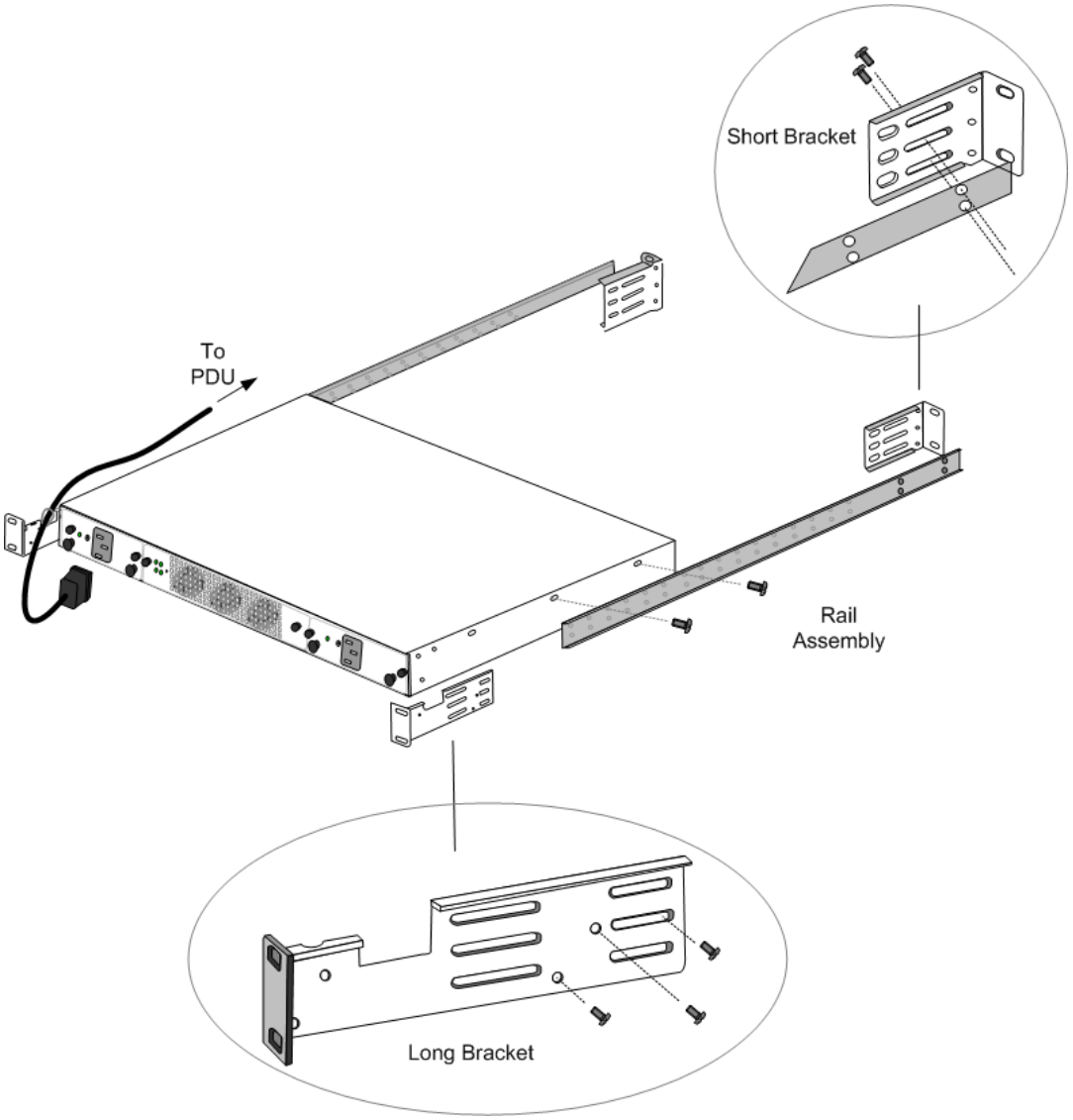
Table 13: Rail Kit (P/N KIT-00008) Detailed Part List

Item	P/N	Illustration
2 x short bracket	290000169	
2 x Mounting Bar	MEC-00556	 Front side of the chassis Rear side of the chassis
14 x Pan Head Philips Screw, 8-32 x 1/4" with tooth lock washer and nylon patch	FAS-00044	
Long Bracket (right side)	MEC-00555	
Long Bracket (left side)	MEC-00554	

6.5.2 Option 1

The rail assembly described in this section enables front-to-rear switch installation within the rack, meaning that the front of the switch faces the front of the rack. The front of the switch is recessed 5 inches from the vertical rail of the rack to allow connecting the power cords from the front side of the rack.

Figure 13: 4036/2036 – Option 1 Assembly



NOTE: Standard rack clip nuts and rack screws are not provided.

➢ ***To mount the 4036/2036 in a rack using Option 1***

1. Put the chassis on a flat surface.

Mount the long bracket at the front of the chassis using three 8-32x1/4" pan head Philips screws.

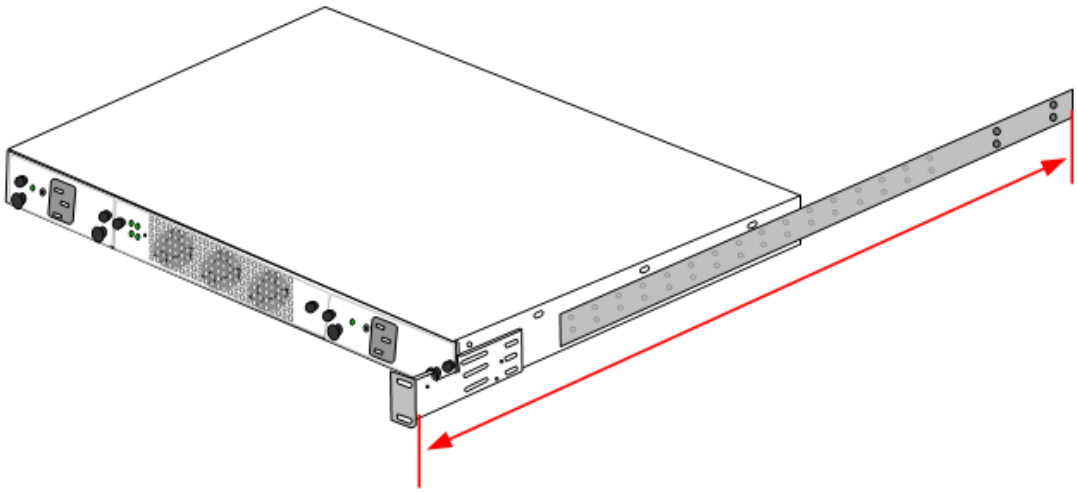
Important: Left and right long brackets are different. Make sure that you are using the correct bracket. The mounting ear at the end of the bracket should face out.

Figure 14: Mounting the long bracket

2. Position the mounting bar and adjust it according to the rack measurements you made while Measuring the Distance between Mounting Rails (on page 33).

   Note: Make sure that the distance is between 0.5" to 1" smaller than the distance you measured between the two vertical rack rails.

Figure 15: Positioning and aligning the mounting bar and long bracket



Total distance = rack measurements you made in while Measuring the Distance between Mounting Rails (on page 33).

3. Connect the mounting bar to the side of the switch using two 8 32x1/4" pan head Philips screws using the top holes of the mounting bar.

   Make sure to install one screw at the center of the switch and the second one at the rear of the switch.

Figure 16: Securing the mounting bar

Switch Rear Switch Front

4. Repeat the previous steps (1-3) on the other side of the chassis.

5. Ensure that the clip nuts are already installed in the rack holes of the correct U level (on all four vertical rack rails) as described in Measuring the Distance between Mounting Rails (on page 33).

   Note: Rack clip nuts are not provided by Mellanox.

Figure 17: Installing the clip nuts and placing the power cord

6. Place the power cords with the female connector facing the front of the rack (or the switch) with approximately 10" hanging out of the front.

   Route the other side (male connector) of the power cord to the rear of the rack. Do not connect it to the PDU at this stage.

7. Lift and position the chassis, aligning the holes of all brackets with the rack holes of the correct U level.

   Gently push the switch inwards leaving it slightly protruded.

Figure 18: Inserting the switch into the rack

8. Place the power cords over the indentation of the long brackets.

Figure 19: Power cord over the long bracket

9. Secure each power cord with a cable tie wrap so that you can still adjust the length of the cord if required.

Figure 20: Securing power cords

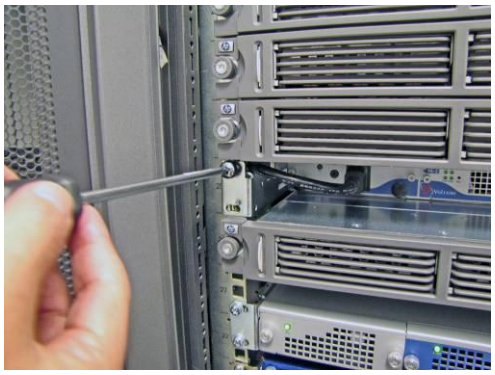
10. Connect the power cords to the switch power supplies (PSU).

Figure 21: Connecting the power cables

11. Push the switch inwards (from the front side of rack) until the long bracket comes together with the rail.

12. Fasten the long brackets to the rack's vertical rails using two screws per bracket and tighten them.

Figure 22: Secure the long brackets to the rack rail

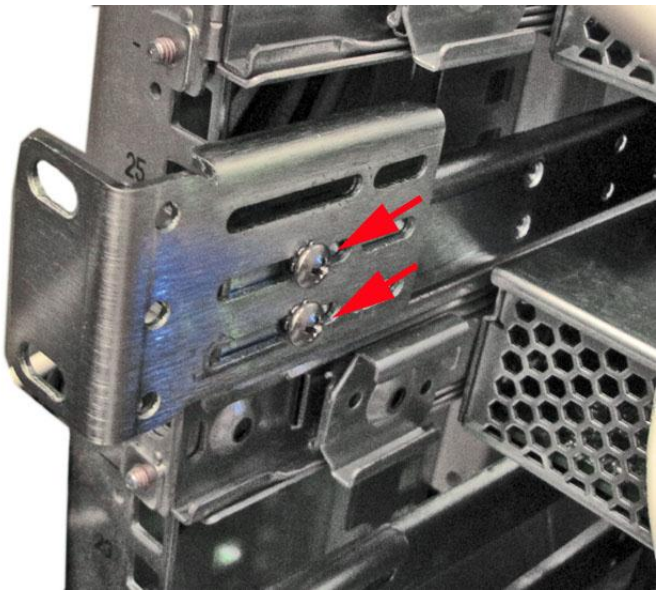


13. Mount a short bracket from the inner side of the mounting bar and fasten it using two 8-32x1/4" pan head Philips screws.

    At this stage, do not fully tighten the screws.

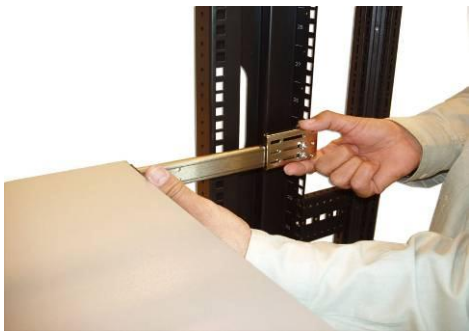
    Important: Use the lower holes in the short bracket as shown in the figure.

Figure 23: Mounting the short bracket



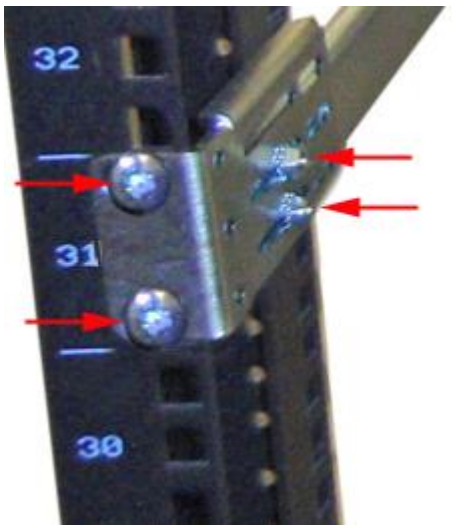
14. Adjust the short brackets snuggly onto the rack's vertical rail using the adjusting holes (make sure that the rail is perfectly aligned by using the same U as used in the front of the rack).

Figure 24: Adjusting the short bracket



15. Tighten the rack screws. (Rack screws are not supplied)
16. Tighten the short brackets to the mounting bars.

Figure 25: Securing Screws and Brackets



Result – Rack rear view

Figure 26: Switch mounted in a rack – Rack rear view

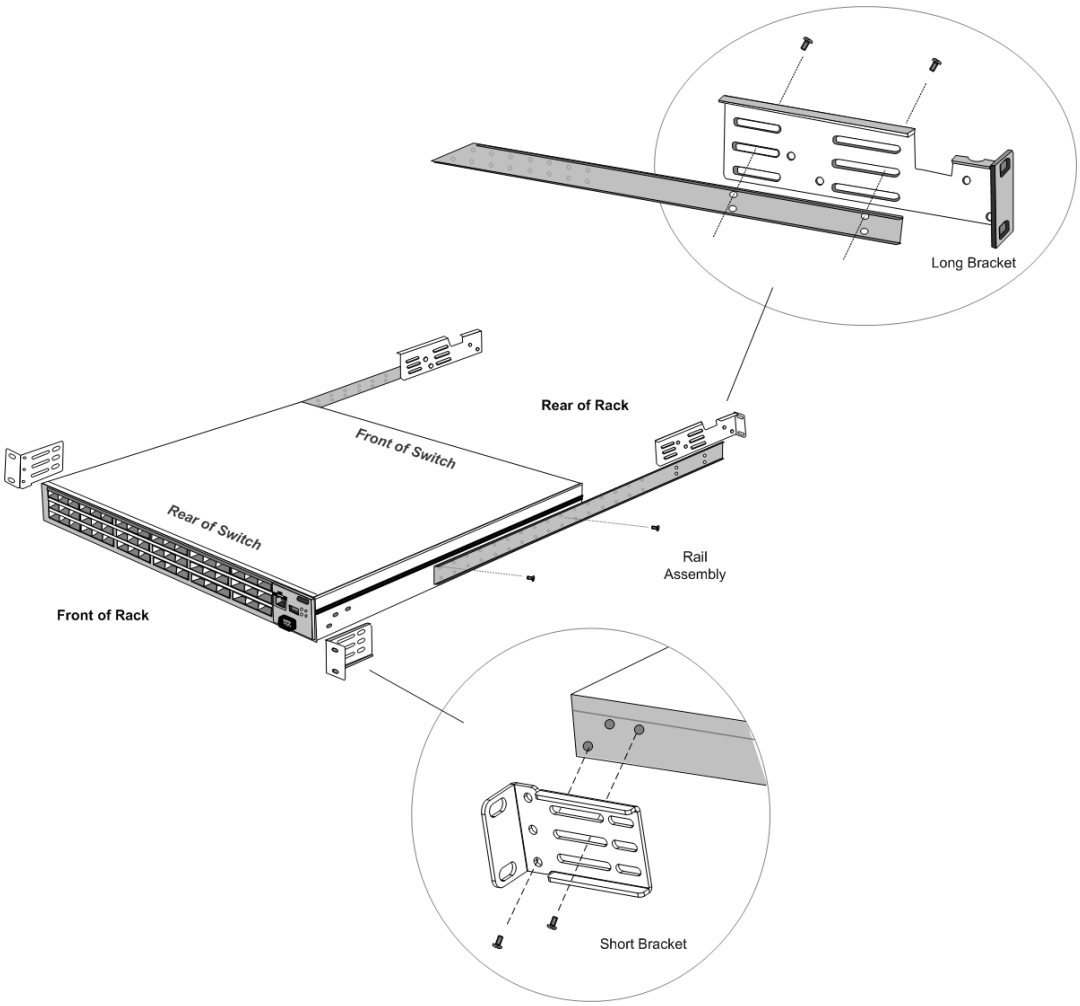
Result – Rack front view

Figure 27: Switch mounted in a rack – Rack front view

6.5.3 Option 2

The rail assembly described in this section enables rear-to-front switch installation within the rack, meaning that the rear of the switch (InfiniBand connector side) faces the front of the rack. This rear-to-front chassis installation is in-line with the vertical front rails of the rack.

Figure 28: 4036/2036 – Option 2 Assembly



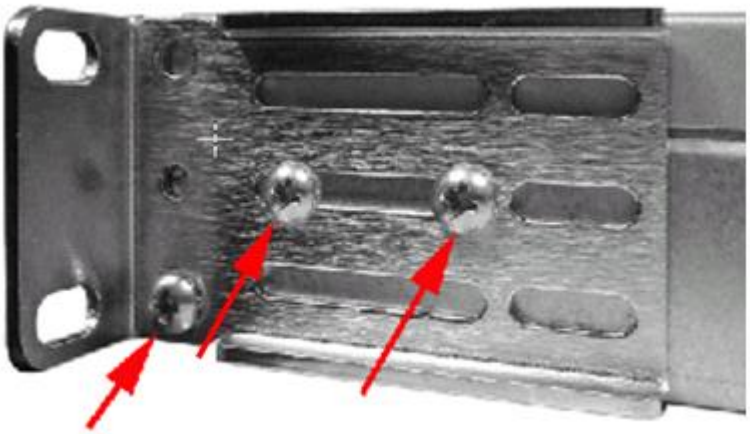
NOTE: Standard rack clip nuts and rack screws are not provided.

➢ ***To mount the 4036/2036 in a rack using Option 2***

1. Put the chassis on a flat surface.

On each side of the chassis, mount the short brackets on the rear side of the switch (InfiniBand port side) using three 8-32x1/4" pan head Philips screws, as shown on the picture.

Figure 29: Mounting the short bracket

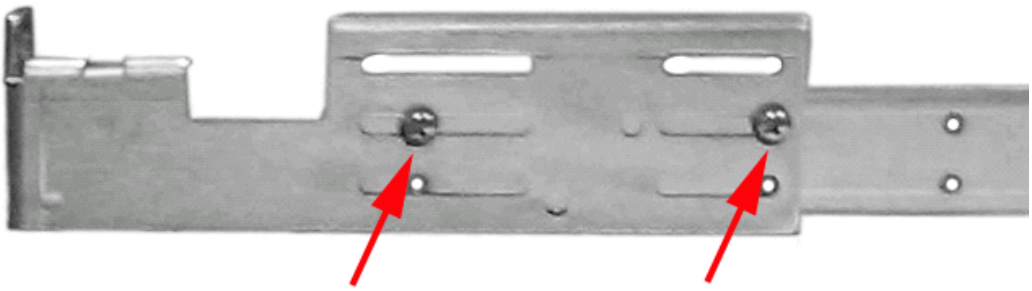


2. Mount the long bracket at the front of the chassis using two 8-32x1/4" pan head Philips screws. Use the long bracket middle row orifices and the holes of top row on the rail.

   Important: Left and right long brackets are different. Make sure that you are using the correct bracket. The mounting ear at the end of the bracket should face out.

   At this stage, do not fully tighten the screws.

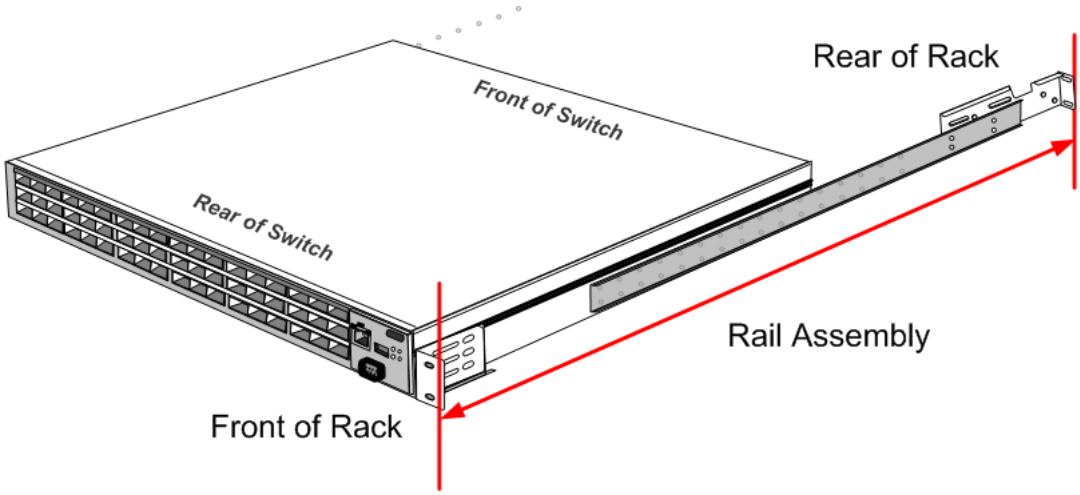
Figure 30: Mounting the long bracket



3. Position the mounting bar and adjust it according to the rack measurements you made while Measuring the Distance between Mounting Rails (on page 33).

Note: Make sure that the distance is between 0.5" to 1" greater than the distance you measured between the two vertical rack rails to allow adjustment at a later stage.

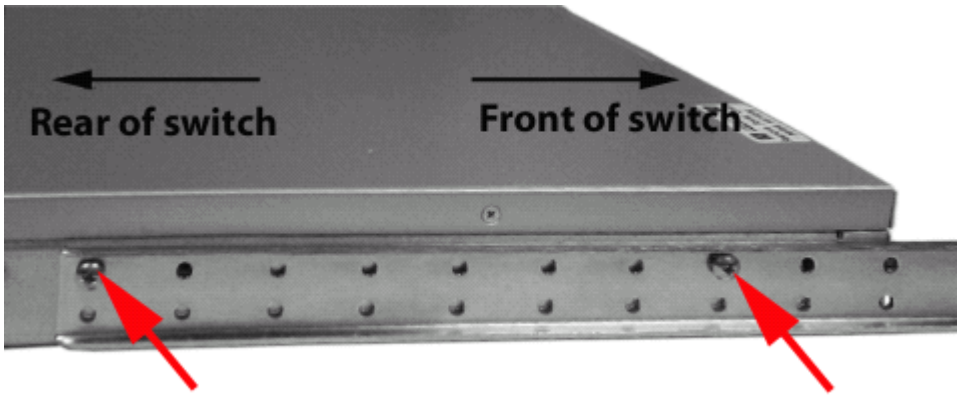
Figure 31: Positioning and aligning the mounting bar and long bracket



Total distance = rack measurements + 0.5 to 1" for adjustment.

4. Secure the rail on the side of the switch using two 8-32x1/4" pan head Philips screws (use the holes on the top row). Make sure you install one screw in the middle of the switch and the other screw at the edge (use the holes on the top row of the rail).

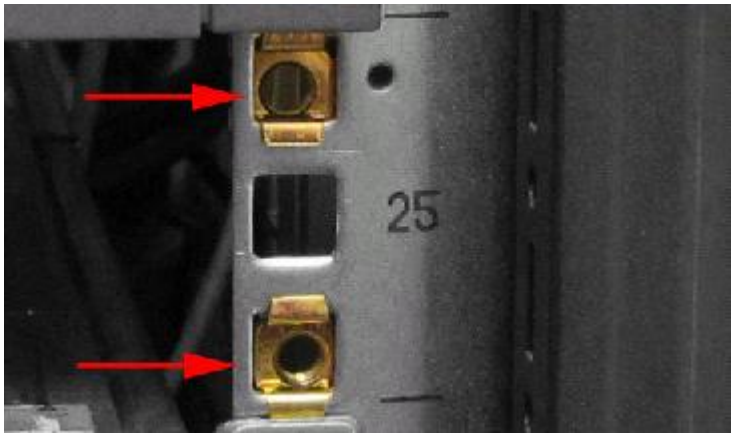
Figure 32: Securing the rail



5. Ensure that the clip nuts are already installed in the rack holes of the correct U level (on all four vertical rack rails) as described in Measuring the Distance between Mounting Rails (on page 33).

Note: Rack clip nuts are not provided by Mellanox.

Figure 33: Placing the clip nuts on the vertical rack rails



6. Go to the front of the rack.

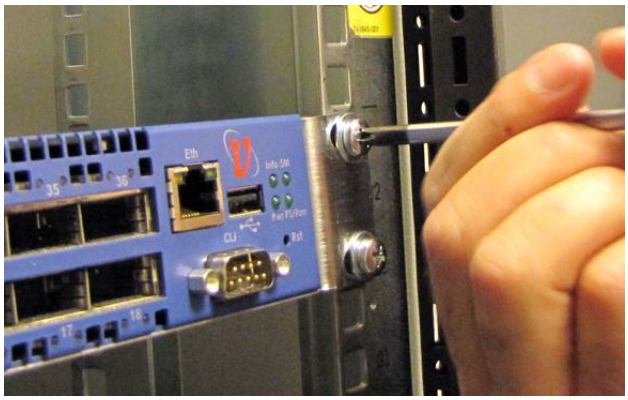
   Note: For ease of installation, at least two qualified people should perform the following steps.

   Lift and position the switch with the connectors facing towards you and insert it into the rack.

Figure 34: Insert the switch into the rack

7. Align the short bracket holes with the rack holes of the correct U level and secure them using two rack screws on each side (not provided by Mellanox).

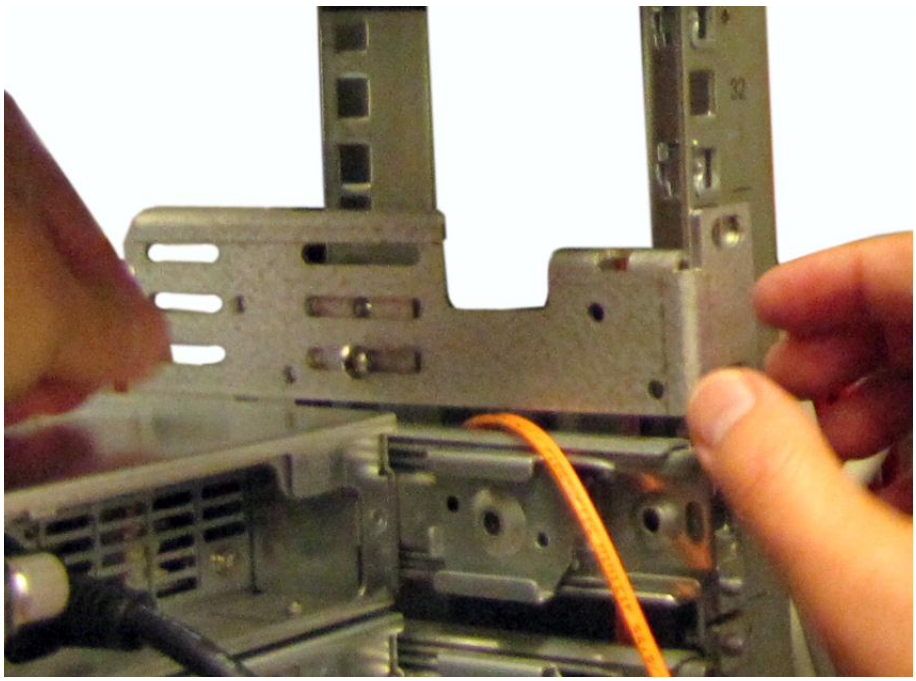
Figure 35: Secure the rack screws



8. Go to the rear of the rack.

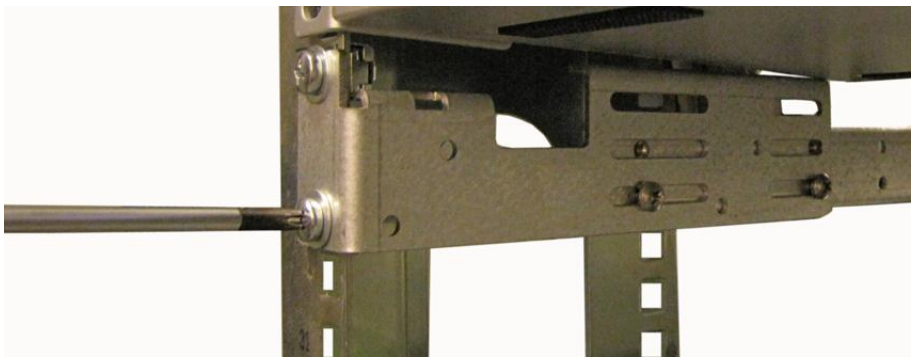
On each side, align the long bracket holes with the rack holes of the correct U level and secure them using two rack screws (not provided by Mellanox) and two rail screws.

Figure 36: Installing the long bracket



9. Tighten the rack screws. (Rack screws are not supplied)

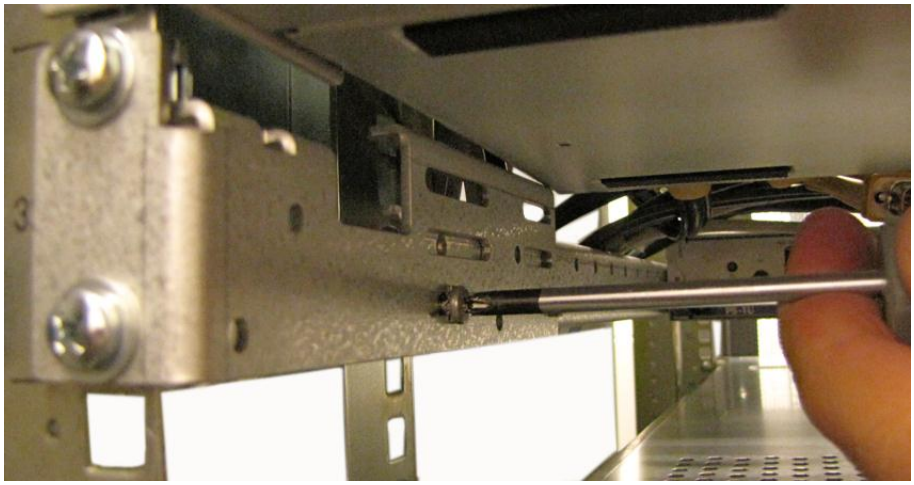
Figure 37: Securing the rack screws



10. Tighten the long brackets to the mounting bars.

Important: This step should be done last.

Figure 38: Securing the long bracket screws to the mounting bar



Result – Rack front view

Figure 39: Switch mounted in a rack – Rack front view

6.6 4036/2036 Switch Power Up

Once the 4036/2036 chassis is secure within the rack, electrical cables from the power distribution source can be fitted in preparation for connection.

Two power cords are supplied by Mellanox, one per power supply unit.

➢ ***To power up the 4036/2036 switch:***

1. Ensure that all site power requirements have been met before connecting the chassis to a power source.
2. Before turning on the power, verify that the power supplies and fan tray are properly inserted.
3. Connect the power supply cords to the AC inlets of the Power Supplies (PSU) located at the front of the chassis.
4. Connect the other side of the power cords to the PDU.

   The PWR LED indicator lights up.

6.7 Field Replaceable Units

6.7.1 Fan Unit

The 4036/2036 switch has a hot swappable Fan Unit with three fans that are used to maintain proper cooling, as shown.

In normal operation, the two fans work at 50% utilization.

In case of fan failure or high temperature detection, the fans go into Turbo mode. In case of fan failure, the fan drawer LED and the PS/FAN LED on the rear panel blink.

When removing the fan unit, the system can continue to function up to 5 minutes before a new fan unit is installed.

Figure 40: Replacing the Fan

➢ ***To replace the hot-swappable Fan module***

1. Release the captive fasteners at each side of the fan and gently remove it from its slot.
2. Position the rear of the new fan in the slot.
3. Holding the fan level, slide it into the slot until it meets resistance at the chassis connector. It should slide smoothly and easily.
4. Push the module further until it is completely seated.
5. Use the captive fasteners at each side of the fan to secure it in place.

6.7.2 Power Supplies

The 4036/2036 switch has two identical hot swap Power Supplies in the side bays of the unit chassis in order to maintain proper cooling, as shown.

The 4036/2036 switch supports current sharing operation of the two power supplies, if applicable.

When removing a power supply from the chassis, the other supply can power the entire chassis.

Figure 41: Replacing the Power Supply

NOTE: Power supplies can be replaced while the power is ON. However, it is recommended to turn the power OFF before replacing the power supply.

➢ ***To replace a hot-swappable power supply module***

1. Release the captive fasteners at each side of the power supply and gently remove the power supply from its bay.
2. Position the rear of the new power supply in the bay.
3. Holding the power supply level, slide it into the slot until it meets resistance at the chassis connector. It should slide smoothly and easily.
4. Push the module further until it is completely seated.
5. Use the captive fasteners at each side of the power supply to secure it in place.

7 Cabling

This chapter provides details on the 4036/2036 switch cable guide brackets installation and cable management.

7.1 Cabling Guide Bracket Installation

NOTES:

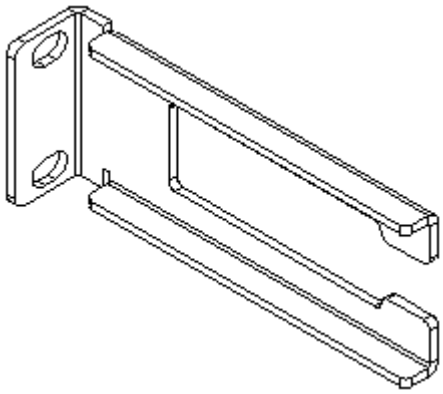
- Selecting the optimal InfiniBand cable length depends on the overall cluster configuration and requires proper planning to produce orderly and maintainable cabling.
- The rack space for the 4036/2036 switch should be free from obstructions such as power strips.

The Cabling Guide brackets (CG-24) are optional; however, it is recommended to use the Cabling Guide Brackets.

The rack mounted Cabling Guide Brackets (CG-24) should be installed in the back of the rack itself, facing out.

Rack rails should be free of PDU and power inlets.

Figure 42: Cabling Guide Bracket (CG-24)



➢ ***To Install the Cabling Guide Brackets (CG-24)***

1. Install the Cabling Guide Bracket at the rear of the rack itself, on top or the rail bracket, using two standard rack screws, as shown in Figure 7-2.
2. Repeat on the other side.

3. Tighten the screws.

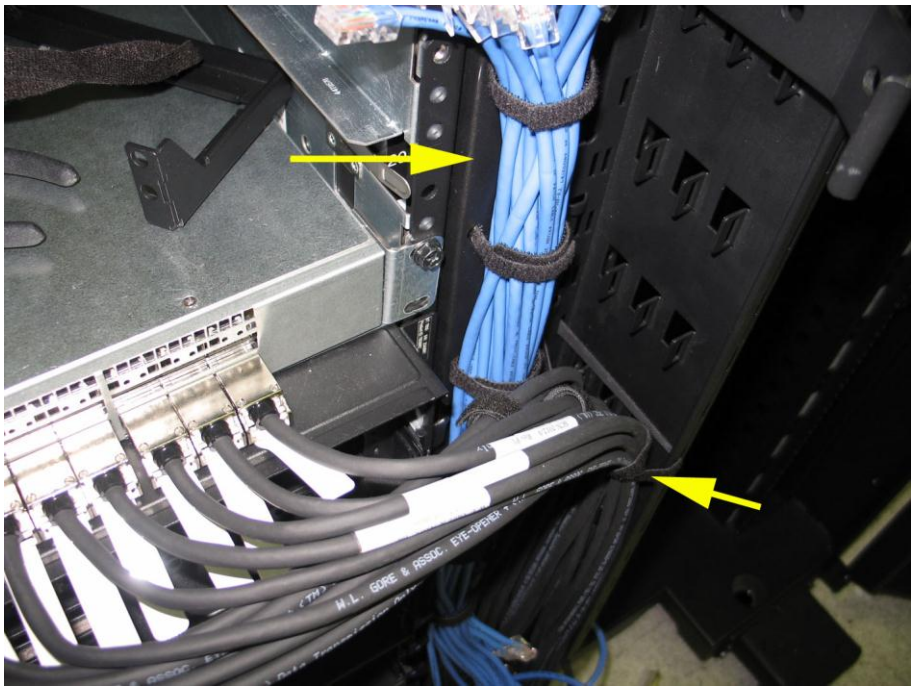
Figure 43: Installing a Cabling Guide Bracket

Figure 44: Installing a Cabling Guide Bracket (sliding rail)

The following shows the final results.

Figure 45: Cable Management

Figure 46: Cabling



7.2 InfiniBand Cabling - QDR

Selecting proper InfiniBand cable lengths depends on the overall cluster configuration and requires proper planning to produce orderly and maintainable cabling.

We recommend dressing the cables from each row of QSFP connectors into two groups running them left and right, and fastening them down gently after connectivity was verified. They will be routed down along the Rack side wall.

It is assumed here that the cable lengths and inter-rack cable routing have already been determined.

The InfiniBand cables are connected to the 4036/2036 switch rear panel.

IMPORTANT: You can connect and disconnect cables while the 4036/2036 switch is powered on.

➢ ***To connect an InfiniBand cable to a 4036/2036 switch***

1. Insert the cable into the Cabling Guide bracket, if it applies.
2. Position the connector opposite a connector located on the rear of the 4036/2036 chassis. Depending upon the InfiniBand connector type, squeeze the tabs on either side of the head shell, and push the connector in place.

   OR

   Gently push the latch and push the connector in place.
3. Verify that the cable is inserted properly into the connector by gently tugging the cable; verify that the Link State green-colored LED lights (and does not flash) indicating a good physical connection.
4. Route the cable to the nearest convenient rack location and gently fasten in place with Velcro tie or tie wraps.

CAUTION:

- Avoid using tie wrap guns or similar tools; do not fasten the InfiniBand cable too tightly, as this may cause irreversible damage to the cables.
- Tie wraps and zip ties could cause potential damage to the cables. Velcro tie is the recommended option.
- Do not bend the InfiniBand cables too sharply. The minimum bend radius is 4" (10 cm).

InfiniBand Cabling — Do's and Don'ts

Do not kink the cable

Do not over-bend the cable behind the connector

Do not twist the connector

For Port Cable Specifications, refer toAppendix A (on page 59).

7.3 Multipurpose Management (Mng) Console Cable

For out-of-band management of a 4036/2036 switch, a single Multi-purpose cable kit is provided, as shown.

This kit contains the Mng cable and the following adaptors:

- RJ45 to RJ45 cable
- A RJ45 to DB-9 cross-adaptor for RS-232 console connection (CLI). (The DB-9 adaptor has a number 26 printed on it. This means that pins 2 and 6 are crossed).
- A RJ45 to DB-9 adaptor for RS-232 console connection

> **IMPORTANT:** Both serial and Ethernet management ports of a 4036/2036 switch can be connected simultaneously. However, the Ethernet ports of the front and the rear panels cannot be connected simultaneously.

➢ ***To connect multi-purpose cable of a 4036/2036 switch:***

1. Connect the DB-9 connector and the RJ45 connector to each extremity of the multipurpose console cable (Mng).
2. Connect the DB-9 connector to the 4036/2036 switch CLI port.
3. Connect the RJ45 connector to the Ethernet port either on the rear panel or on the front panel (but not to both).

8 Operation

This chapter describes how to operate the 4036/2036 switch, once the installation is complete. The 4036/2036 switch operation consists of making sure that it starts up properly and that any initialization problems are resolved.

8.1 Powering on the 4036/2036 Switch

To start up the 4036/2036 unit:

- The 4036/2036 chassis should be secured within the rack.
- The InfiniBand cables should be plugged into the rear panel ports.
- AC electrical circuit(s) should be available in preparation for connecting the 4036/2036 AC cable(s).

CAUTION: Ensure that all site power requirements have been met before connecting the chassis to the power source.

IMPORTANT: Line cords should be connected to separate AC circuits for maximum fault tolerance in the event of power problems.

NOTE: For more details regarding the unit's indicators, refer to 4036/2036 Switch LED (on page 56).

Once the 4036/2036 chassis is secure within the rack, electrical cables from the power distribution source can be fitted in preparation for connection.

Mellanox supplies two power cords, one per power supply unit.

➢ ***To start up the 4036/2036 switch:***

1. Ensure that all site power requirements have been met before connecting the chassis to a power source.
2. Before turning on the power, verify that the power supplies and fan tray are properly inserted.
3. At the rear of the 4036/2036 switch, plug the power cord into the power receptacle. Repeat for the other power supply, if present.
4. Check that the power supply indicator light is green. Repeat for the other power supply, if present.
5. Check for the following 4036/2036 switch status indicators:
   - PWR - Lights in green, indicating that the 4036/2036 switch is functional.

- SM - Indicates the subnet management functionality: on for active mode, blinking for standby mode.
- PS/FAN - Lights solid green, indicating that the 4036/2036 switch is properly powered and the fan unit is functioning adequately.

6. If any of these conditions is not met, refer to Solving Startup Problems (on page 58) to isolate and, if possible, resolve the problem.

8.2 4036/2036 Switch LED Indicators

The following table lists the LED indicators and their functions and descriptions of different states.

Table 14: 4036/2036 Switch LED Indications

LED Name	Color	Location	Status	Functionality
PWR	Green	Front panel- On each PSU	ON	PSU DC OK
			OFF	PSU DC problem
Fan	Green	Front panel (fan drawer)	ON	All fans operational, Nominal temperature
			OFF	None of the fans are working
			BLINK	At least one fan problem or high temperature
SM	Green	Front panel (fan drawer)	ON	SM is active
			OFF	SM is not active
			BLINK	SM is in standby mode
Pwr	Green	Front panel (fan drawer)	ON	System power ok
			OFF	System power problem
Info	Green	Front panel (fan drawer)	OFF	The device does not require attention
			BLINK	The device requires attention
Pwr/Fan	Green	Rear panel	ON	All fans operational, Nominal temperature, PSUs OK
			OFF	All fans are not working or power down
			BLINK	At least one fan problem or high temperature, One PSU problem
SM	Green	Rear panel	ON	SM is active
			OFF	SM is not active
			BLINK	SM is in standby mode
Pwr	Green	Rear panel	ON	System power ok
			OFF	System power problem
Info	Green	Rear panel	OFF	The device does not require attention
			BLINK	The device requires attention

LED Name	Color	Location	Status	Functionality
IB physical link	Green	Rear panel on each QSFP port	ON	Port physical link is up
			OFF	Port physical link is down or port is disconnected
			BLINK	Errors, Link is not stable
IB logical link	Amber	Rear panel on each QSFP port	ON	Logical link is configured by SM
			OFF	Logical link is not configured by SM
			BLINK	traffic on the link
Eth link	Green	Rear panel RJ45 connector	ON	Eth link is up
			OFF	Eth link is down
	Amber		OFF	No eth traffic
			BLINK	Eth tragic activity

8.3 Where to Go Next

Once you have verified that the 4036/2036 hardware is properly installed, it is ready for system configuration. To configure the system, refer to the *Grid Director 4000 Family User Manual*.

9 Troubleshooting

9.1 Overview

This chapter provides suggestions for solving startup problems and useful information when contacting Mellanox Customer Service.

9.2 Solving Startup Problems

Try to solve startup problems using the 4036/2036 switch LED indicators.

Case 1

Problem with power supply – How do I know that my power supply is not functional?

Check the power cord and its connections. Check the installation of the power supply module.

If the indicator is blinking, the 4036/2036 power supply is faulty. Replace the power supply module, if necessary.

> **NOTE:** In single power supply systems, the AC power cord must be plugged into the same side of the chassis as the power supply.

Case 2

What should I do when there is a Fan indication problem?

Replace the Fan Unit.

Case 3

When the physical link indicator is OFF, is the InfiniBand cable or connector faulty?

When the physical link indicator is ON, the logical link indicator is OFF, and the SM indicator is ON, the InfiniBand cable or the connector is faulty. In case the InfiniBand cable is faulty, replace the cable. If the problem is not solved, contact Mellanox Support.

9.3 Preparation before Contacting Customer Service

If you are unable to solve a startup problem after using the troubleshooting suggestions in this chapter, contact a customer service representative for assistance and further instructions. Before you call, have the following information ready to help your service representative assist you as quickly as possible:

- Date you received the Grid Director 4036/2036 switch
- Chassis serial number (located on a label on the bottom of the chassis)
- Type of software and release number
- Maintenance agreement or warranty information
- Brief description of the problem
- Brief explanation of the steps you have already taken to isolate and solve the problem.

Appendix A: Option 3 – Chassis Installation in an iDataPlex Rack

A.1 Unpacking the 4036/2036 Switch

NOTE: Keep the original packing materials; they will be needed if:

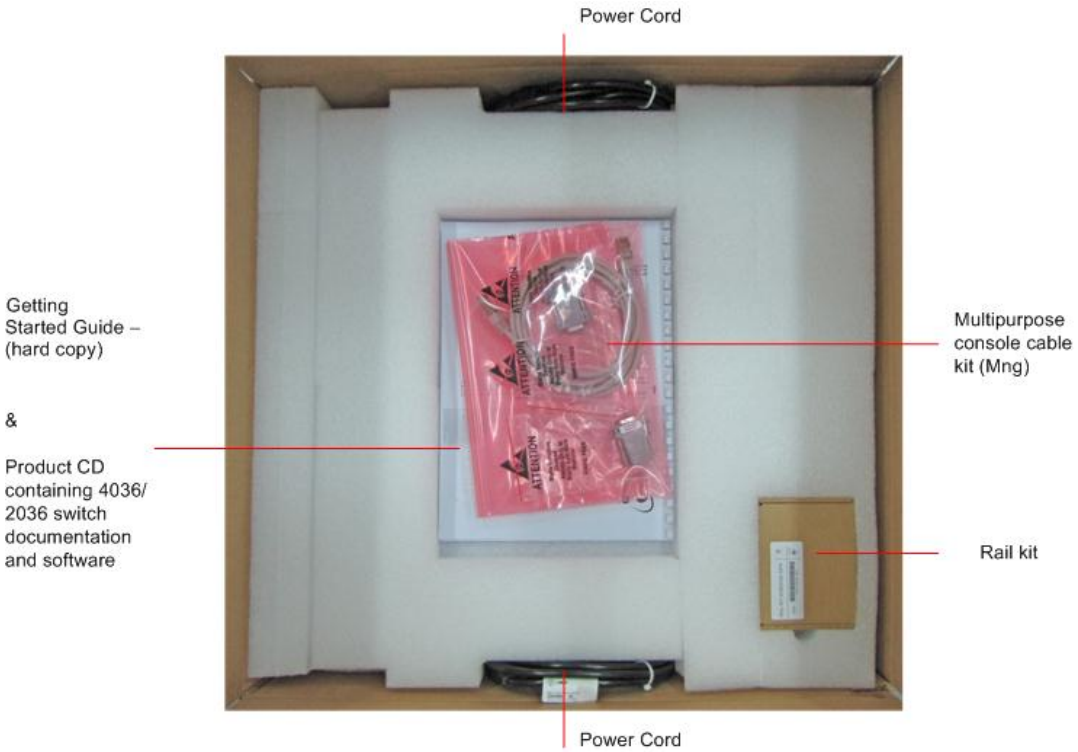
- The product needs to be moved. For example if it is staged at one location before being delivered at the production site.
- A module needs to be returned for repair, replacement, or upgrade.

The 4036/2036 chassis is supplied in a box similar to the one shown in the following figure.

➢ ***To unpack the 4036/2036 chassis, perform the following steps:***

1. Open the box and check that they contain the items listed in the Packing List.

Figure 47: 4036/2036 Cardboard Package (Open) - Standard



2. Remove the box containing the Rail Kit, the Power Cords, and the multipurpose console cable kit (Mng).
3. Remove the Getting Started Guide which also contains the documentation and software CD.
4. Remove the top foam.
5. Carefully remove the 4036/2036 switch, lifting the it using the dedicated niche as shown in Figure 2-2.

6. Remove the protective antistatic bag from the 4036/2036 switch.

A.1.1 Multipurpose Console Cable Kit

Refer to Multipurpose (Mng) Console Cable Kit (on page 53).

A.1.2 Packing the Switch

Refer to Packing the 4036/2036 Switch (on page 14).

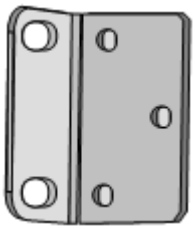
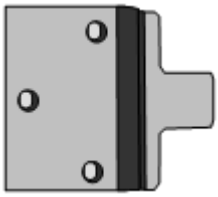
A.2 Mounting the iDataplex Kit

The 4036/2036 switch is a 19" rack mounted, 1U high chassis provided with a rail kit accommodating iDataplex racks with a front-to-back distance between mounting rails of 15.75" (400 mm). The switch cooling direction is from rear to front.

The following table lists the items required for the 4036/2036 installation in an Datplex rack.

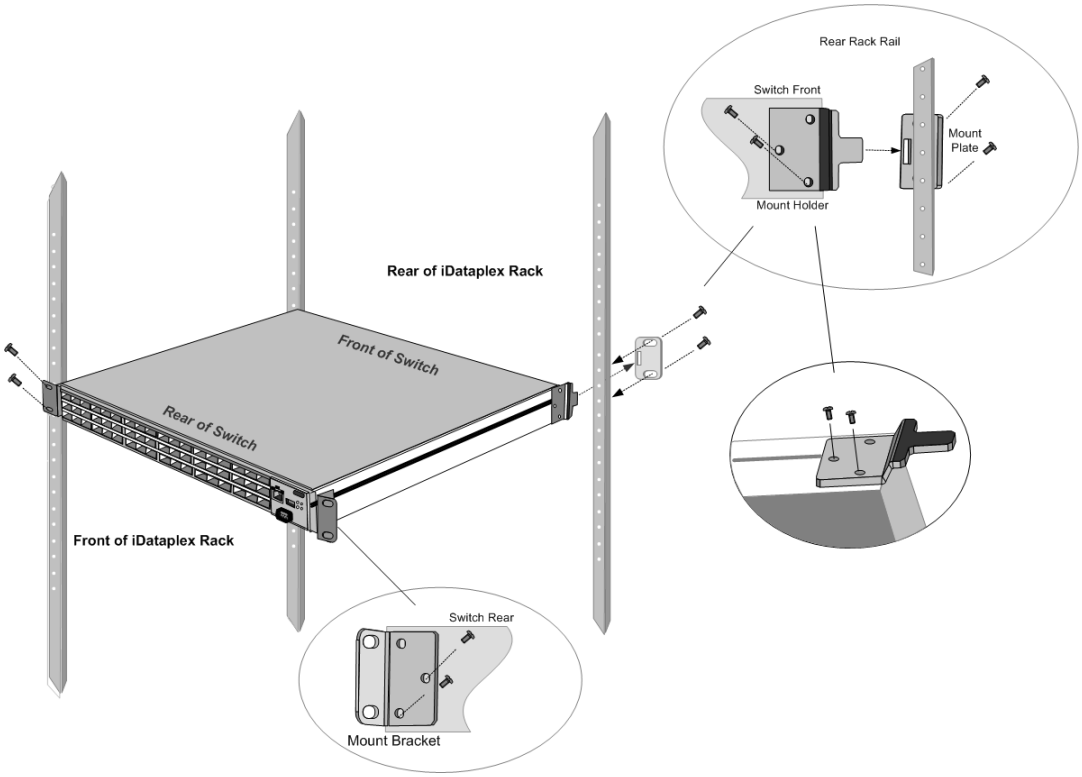
NOTE: Item sizes are not proportional

Table 15: iDataplex Mounting Kit (P/N KIT-00004) Part List

Item	P/N	Quantity	Illustration
19" MOUNT BRACKET	MEC-00409	x2	
MOUNT HOLDER	MEC-00410	x2	
MOUNT PLATE	MEC-00413	x2	
14 x Pan Head Philips Screw, 8-32 x 1/4" with tooth lock washer and nylon patch	FAS-00044	x8	

Assembly in an iDataPlex Rack

Figure 48: 4036/2036 – Assembly in an iDataplex Rack

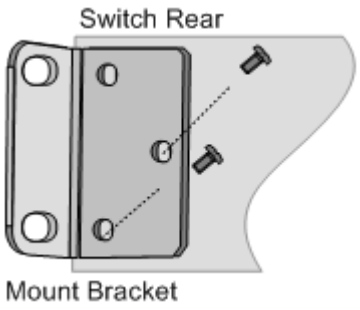


NOTE: Standard rack clip nuts and rack screws are not provided.

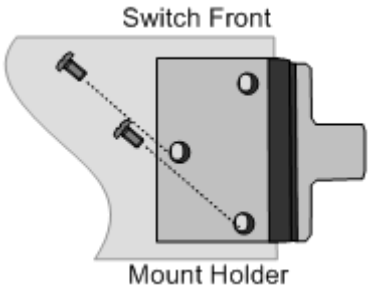
➢ ***To mount the 4036/2036 in an iDataplex rack***

1. Put the chassis on a flat surface.
2. On each side of the switch, attach the **mount brackets** to the **rear** of the chassis (connector side) using two 8-32x1/4" pan head Philips screws.

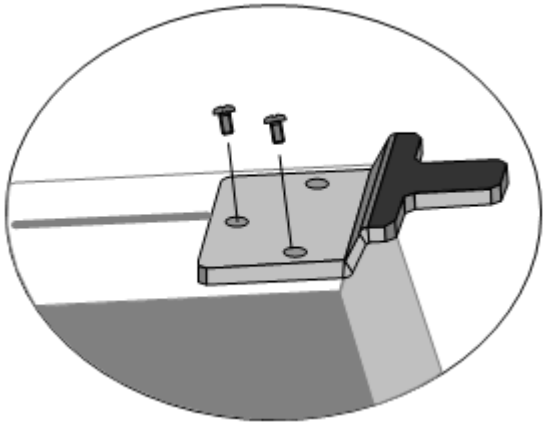
Figure 49: Attaching the mount bracket



3. On each side of the switch, connect the **mount holders** on the **front** side of the switch using two 8-32x1/4" pan head Philips screws.



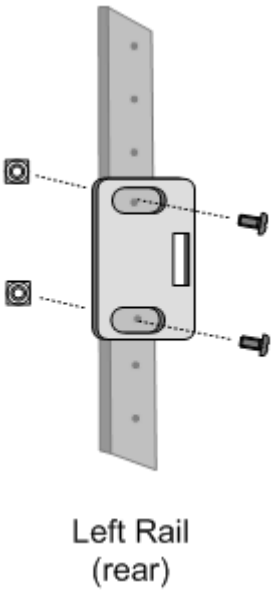
Important: Make sure that you install the mount holders with the hook facing out, as shown below.



4. Go to the rear of the rack:
   1. Place two clip nuts on each side of the desired U level of the rack rails.
   2. Secure the mount plates at the rear side of the rack rail (into the clip nuts) using two screws.

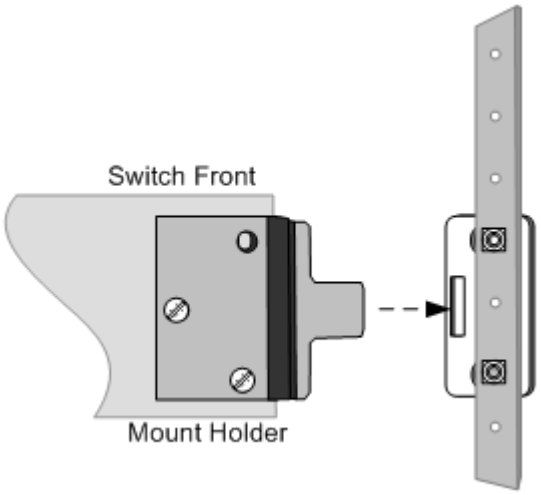
   Note: Rack clip nuts and screws are not provided by Mellanox.

Figure 50: Securing clip nuts and the mount plates onto the rack



5. Install the switch by inserting the **mount holders** hooks into the dedicated rectangular slot in the **mount plates**.

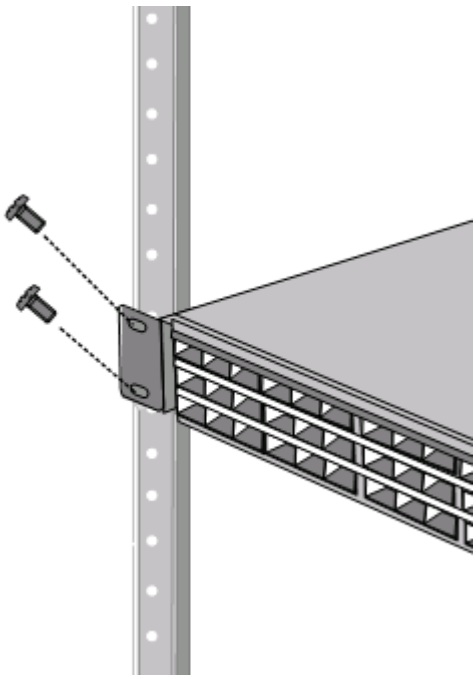
Figure 51: Inserting the mount holder into the mount plate



6. On the front side of the rack, secure the front of the chassis, aligning the mount brackets holes with the rack holes of the correct U level.

   Note: The Philips screws are not provided by Mellanox.

Figure 52: Securing the front of the chassis



7. Connect the power cords to the power supplie (PSU) at the front of the chassis (repeat for the other power supply, if present).
8. At the rear of the chassis, connect the InfiniBand cables.

Appendix B: Cabling Information

This appendix provides cabling and port pinout information for the 4036/2036 switch.

B.1 IB Port Cable Specifications

The following table describes cabling specifications for the 4036/2036 4X InfiniBand ports.

Table 16: 4X InfiniBand Port Cabling Specifications

Type	Maximum Cable Length			
	AWG	Length (ft.)	Length (m)	Gore Cable P/N
4XQDR	26	16.4	7	QSN7600-5
	26	13.1	4	QSN7600-4
	28	9.84	3	QSN3800-3
	30	6.57	2	QSN3300-2
	30	4.93	1.5	QSN3300-1.5
	30	3.28	1	QSN3300-1
	30	1.64	0.5	QSN3300-0.5
4XQDR – 4036/HCA	26	19.7	8	QSN7600-6
	26	16.4	5	QSN7600-5
	28	9.84	3	QSN3800-3
	30	6.56	2	QSN3300-2
4X DDR 2036/ISR2012	24	32.8	10	QSIBN-5000-10
	24	26.3	8	QSIBN-5000-8
	26	23.02	7	QSIBN-5600-7
	28	19.7	6	QSIBN-5800-6
	30	16.4	5	QSIBN-5300-5
	30	13.1	4	QSIBN-5300-4

B.2 1 GbE Ports (Management)

Use modular, RJ-45, straight-through UTP cables to connect the 10/100/1000 Fast Ethernet ports to external switches and routers. Use modular, RJ-45 cross-connect cables to connect to end systems. The following figures show straight-through cables and cross-connect cables.

Figure 53: Straight-through Cables

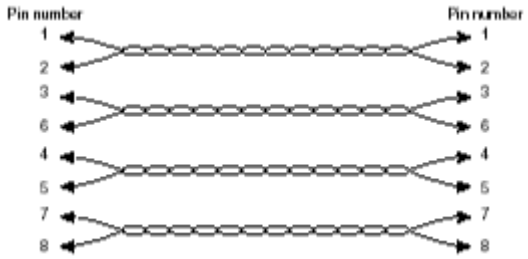
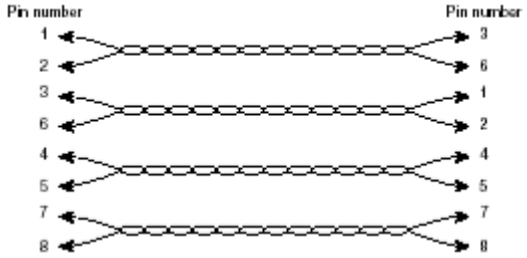


Figure 54: Cross-connect Cables



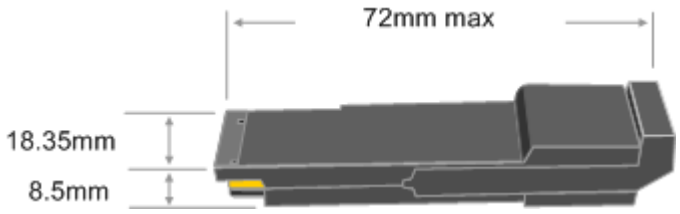
The 10/100/1000 Fast Ethernet port supports a RJ-45 connector.

Appendix C: QSFP Cable

QSFP (Quad Small Form-factor Pluggable) Key Features:

- Small size, high density, hot-pluggable connector with four transmit and four receive channels
- Supports both types of cables:
  - Copper active or passive cable.
    - Copper passive cable is equipped with two simple passive connectors and a standard copper cable.
    - Copper active cable equipped with an active device to optimize signal quality.
  - Fibre optic cable delivered as either:
    - Fibre cable with two separate modules
    - Active optic cable where cable and optic adaptors are delivered as a single unit (permanently attached cable)
- Data rate: 2.5 Gbps (SDR), 5 Gbps (DDR), and up to 10 Gbps (QDR) per channel
- QSFP optic modules use standard MPO parallel 12-fibre jacketed ribbon optical connector
- Provide manageability, discovery, and identification capability, such as vendor identification, module part number, serial number, cable type, using low-speed two-wire (I2C) interface
- Active cables: Integrates digital diagnostic capability to monitor link performance
- Latching mechanism
- Mechanical Dimensions, as shown:

Figure 55: QSFP Connector-Dimensions



NOTE: QSFP to CX4 cables are available to connect 4036/2036 equipped with QSFP with legacy DDR/SDR systems equipped with CX4 connectors.

Overview

Each of the 4036/2036 ports on the switch is equipped with a transmit and receive circuit that can adjust to fit different types of link characteristics and either optical or copper cables.

The QSFP cables, shown previously, transmit and receive up to 10 Gbps per channel (total: up to 40 Gbps per port) over a single active/passive optical or copper cable, Passive copper cables do not consume any additional power while active copper and optic cables consume up to 1.5 Watt.

The following figure shows the QSFP module with Copper or Optical cables. You can install any combination of the three cable types in any of the 36 QSFP cages.

Figure 56: QSFP Connector